5-2015

The Effects of Paperboard Packaging on Consumer Attention to Cosmetic Pressed Powder

Meagan E. Hoffman
Clemson University

THE EFFECTS OF PAPERBOARD PACKAGING ON CONSUMER ATTENTION TO COSMETIC PRESSED POWDER

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Packaging Science

---

by
Meagan E. Hoffman
May 2015

Accepted by:
Dr. R. Andrew Hurley, Committee Chair
Dr. Charles E. Tonkin
Dr. Scott D. Swain

ABSTRACT

There is currently a wide array of packaging styles of cosmetics seen in retail environments such as department stores and convenience stores. However, pressed powder is most often displayed with paperboard backing when in drugstores. This research seeks to understand if this the most effective way to package this product. To test this research question a method was developed to use Tobii's eye tracking technology in partnership with CU Shop in the Sonoco Institute of Packaging Design and Graphics. The experiment was set up to test whether consumers preferred cosmetic powder to be packaged with paperboard backing or if they preferred the product to be without visible packaging and displayed in trays or a point of purchase (POP) -like display. Two fictitious brands were created and used to avoid brand loyalty. The experiment collected three different eye tracking metrics, time to first fixation (TTFF), fixation count (FC), and total fixation duration (TFD). SAS was used to process the data and output statistical results. Between the product in the paperboard backing and the product displayed in the POP display, there was no statistical significance that participants chose the product in the POP display over the paperboard. Survey results indicated that participants were interested in more minimal packaging and would not be deterred to purchase a cosmetic product with less packaging.

DEDICATION

I would like to dedicate my work to two of the most beautiful and inspiring women in my life, my grandmother, Betty E. Munden and my mother, Mary E. Hoffman.

ACKNOWLEDGMENTS

First, I would like to thank my wonderful parents and the rest of my family and friends for their continued support of all my educational endeavors.

I would also like to thank my advisor, Dr. Andrew Hurley, and my committee members, Dr. Chip Tonkin and Dr. Scott Swain, for their incredible guidance and support throughout this project.

I would especially like to thank my mentor and friend, W. Snyder, for all his insight and help with my research and classes throughout the program. Thank you also to my fellow grad students for their support throughout my time in this program: Julianne Holmes, David Stone, Julie Rice, Kelsey Byrd, and David Cottrell.

Lastly, I would like to thank Harris A. Smith and all of the wonderful staff at the Sonoco Institute of Packaging Design and Graphics for their contributions and support throughout my years here.

TABLE OF CONTENTS

Table of Contents (Continued)

Page

LIST OF TABLES

LIST OF FIGURES

List of Figures (Continued)

CHAPTER ONE

INTRODUCTION

Packaging design differentiates one product from another (Koukos, 2002), helping consumers navigate their retail environment. The visual cues that consumers take away from packaging are some of the most important features of package design, as it allows consumers access to information. Part of this accessibility of information draws strength from the visual imagery at the point of purchase (Underwood, 2001). Package design plays an incredibly large role in the consumer purchasing choice since this decision making process is based greatly on visual cues. This highlights the importance of package and display design. When consumers shop for a product in an exploratory visual way they are driven by external stimuli, highlighting that an effective design or shelf layout can influence the search patterns and ultimately the purchase decision (Janiszewski, 2012).

This research seeks to understand how paperboard backing around cosmetic pressed powder affects consumer purchase decision in a retail environment. It was hypothesized that removing the paperboard backing around this specific cosmetic product and displaying the product in a point of purchase (POP) display would be more attractive to consumers, thus decreasing the time to first fixation (TTFF) to the POP display. In addition, removal of this excess packaging would create less waste for consumers as well. This experiment was designed to answer the research question; data was gathered through the use of eye tracking technology and a qualitative survey for participants. Two fictitious brands of cosmetic pressed powder, Wild and Celeste, were created and displayed in

rotation in both paperboard backing and in POP-like trays. This study examined the consumer purchase decision based on three eye tracking metrics; time to first fixation (TTFF), total fixation duration (TFD), and fixation count (FC). Once collected, the raw data was statistically analyzed using SAS. Ultimately, this research was conducted to determine the necessity of the paperboard backing used for cosmetic pressed powder. If deemed unnecessary, the paperboard backing could be eliminated thus saving packaging materials and waste.

CHAPTER TWO

REVIEW OF LITERATURE

Importance of Packaging Design

Everything is packaged, from food to electronics to basic commodities. We rely on packaging to protect, contain, and preserve as well as present an information display (Lee & Lye, 2003). However, as consumers, we have an 'emotional bond' with the packaging as well (Koukos, 2002). We hold certain expectations for the contents; these expectations are created by the perception of packaging. Meaning, that since we have an preconceived understanding that a food product will taste good, it is not surprising that a purchase decision will be based of the aesthetic value of the package (Wells, Farley, & Armstrong, 2007). Part of the value of a brand stems from these customer attitudes. This is derived from product performance and perceived status ("Shopper Marketing Glossary," 2013a). We understand the meaning of the product through our cognitive interpretation of the product and then we take action based on the objective conditions that we see fit (You & Chen, 2007). Emotionally, consumers bond with the product, making its image of the highest importance when creating any package for any product (Koukos, 2002). Costco, the warehouse club, operates by the 5-by-5 rule. This theory states that a "product in a store should convey its value proposition within five seconds from at least five feet away from its position" ("Shopper Marketing Glossary," 2013b). This concept highlights the importance of packaging design as it relates to consumer attention.

Not only does packaging serve our basic containing needs, but it also plays an important role in informing and communicating the customer of the containted contents benefits (Rundh, 2009). This is directly related to the consumer's purchase decision. More and more research is conducted each year to track how influential packaging design can be for the company and the consumer, and basic marketing trends indicate that visual cues influence the decision making process (Clement, Kristensen, & Grønhaug, 2013). These trends are pushing companies to reallocate funds from solely marketing into their packaging departments (R Hurley & Galvarino, 2012).

Packaging design also helps to differentiate one product from another (Koukos, 2002) therefore helping consumers navigate their chosen retail environment. One of the most important features of packaging design is the ability for a consumer to easily access information. The visual cues given from packaging are easier to process compared to verbal advertising. Part of this accessibility of information draws strength from the visual imagery at the point of purchase (Underwood, 2001). Though sometimes it seems as though a purchase decision may require a lengthy amount of time for consideration, consumers use the visual cues provided by packaging to make quick purchase decisions within a matter of seconds (Clement et al., 2013).

One aspect of packaging design lies within the concept of store loyalty with own-label products. This can also be identified as brand affinity ("Shopper Marketing Glossary," 2013a). These can be defined as "any products over which a retailer [has] exercised total sourcing and market control" (Wells et al., 2007). An advantage to this market is the ability to tailor the package to the product and ultimately catch the attention

of the consumer. While package color, typography and graphics are used to catch the eye of the consumer, packaging structural design is also a key element in attracting the consumer and securing the purchase decision. These elements all relate to the consumer's overall perception of the product (R Hurley & Galvarino, 2012).

Package design is a critical element for the retailer and the consumer alike. The packaging, as well as the product, must meet the consumer's standards. Through the use of graphics and structural design, packaging designers can accomplish this and ensure high purchase decision rates for the retailer.

Consumer Purchasing Decision

Packaging design plays an incredibly large role in the consumer purchasing decision. This decision making process is based largely on visual cues highlighting the necessity of captivating design. Marketing and packaging design go hand in hand in order to communicate the product to the consumer in an attempt to solidify the purchase decision. Part of this is commanding a stronger presence on the shelf, not only through visual graphics, but also through modified structural design. Part of this modified design relates to the actual visibility of the product within the package (Thackston, Pham, Galvarino, & Ouzts, n.d.).

Purchasing decision is also related to shelf visibility and placement. It should go without saying that one cannot make a purchase if the product is not visible. Positioning of the product is done so in a manner that it appears on the shelf in the same way that

retailers want the consumer to imagine the product. This also ties together pricing and advertising as it relates to the product (Ampuero & Vila, 2006).

One form of consumer purchasing behavior is impulse purchasing. This is also known as unplanned purchasing behavior (Kollat & Willett, 1967). Packaging design influences purchasing decision as it informs the consumer; however, an impulse purchase is made on an emotional leap rather than an informational one. Packaging shape, graphical layout, and overall design all have the ability to appeal to this human sense ultimately leading to a more sporadic purchase (Kamil & Jaafar, 2011).

Packaging design and the ultimate purchase decision are related in more ways than one. One goal of packaging is to inform the consumer. Graphical layout styles facilitate this information transfer and photographic images also help consumers identify the specific product they are looking for (Kamil & Jaafar, 2011). The layout styles aide in facilitating two different types of visual information search, goal directed and exploratory search. Goal directed search is when a consumer has a specific target in mind and searches the package to find only that. For example, when a consumer is searching for how many of a specific product are contained within a package. Exploratory visual search can be defined as the search that "occurs when consumers lack the motivation or experience needed to search efficiently" (Janiszewski, 1998). External stimuli drive this type of search behavior, meaning that effective design can influence the search behavior of the consumer.

The consumer's perception of the product is a critical factor in influencing the purchase decision. Many consumers relate their perceived attributes of the product to

their wants and desires (Crilly, Moultrie, & Clarkson, 2004). They interpret the brand through these associations and their expectations of the product. These assumptions sway consumers into making a purchase (RA Hurley & Ouzts, 2013).

Another interesting relationship between design and the consumer is that of proportions of the physical package as it relates to the aesthetic perceptions from the consumer. It is an obvious observation that the proportions of the package matter to the consumer. No one wants to handle an awkward box or bag in the grocery store. However, there is no golden ratio for packaging. Each package must be specifically designed for its desired contents and consumer (Raghubir & Greenleaf, 2006). For example, food packages designed for children are often smaller and meant to fit their hands better. However, most normal cereal or cracker boxes fit just fine into adult hands. In these two examples, different packaging proportions relate to each product and their consumer base proving that dimensions are not universal.

Researchers and packaging engineers are constantly working with companies to design better packages both structurally and graphically. Many packaging companies seek this design research in order to reach customers better and in turn boost their sales. One way to capitalize on consumer purchasing is through perception (Folkes et. al.). conducted research experiments specifically related to the consumer idea about the volume of the product contained within the package. They argue that packaging shape can create a “volume judgment” in consumers, causing them to think a package contains more or less product based solely on the structural shape. This “mental contamination” stems from the wide variety of packaging shapes and sizes currently on the market

(Folkes & Matta, 2004). The shapes are obviously directly related to the contents of the package, however even within product types, there are dramatic shifts in package shape. One common error made by consumers is between round and rectangular objects. Folkes notes that consumers make the volume decision based on the initial dimension (generally the size of the two shapes) (Folkes & Matta, 2004). This however does not take into consideration the other dimensions such width and depth. Research also shows that consumers perceive elongated containers to hold less volume than those that are shorter and wider. Consumer perception of product volume is also related to personal usage of the product. Ultimately the purchase decision relates back to the intended use for the product. This takes the concept of consumer volume judgment and relates it back to the ultimate product use (Wansink, 1996).

Another contaminant for consumers is the store environment. Consumers are easily distracted by point of purchase displays and surrounding products and are unable to give their full attention to the actual product to which they are searching (Clement et al., 2013).

Blister Packaging

Blister packs are used frequently in the packaging industry. These packages are easily recognizable with a translucent, molded plastic casing that covers or attaches to a piece of cardstock, kraft board or other durable substrate ("Shopper Marketing Glossary," 2013a). The plastic portion is usually thermoformed as that is the easiest and most time efficient method of production.

An advantage to this type of packaging is its display ability on a pegboard or slat wall. These are wall displays to which panel material is attached; these walls can be modular and accommodate a range of shelving and hook options ("Shopper Marketing Glossary," 2013c).

An example of blister packaging can be found in Figure 1 below.

Figure 1. An example of blister packaging for L'Oreal Mascara

Retrieved from personal photo library taken at Rite Aide, Clemson, SC

Display Types

In the packaging industry there are many different display types all with broad and pliable definitions. Boundless Marketing defines a point of purchase display as "Point-of-sale displays are sales promotions that are placed where they can easily draw customer attention and trigger impulse buying" ("Point of Purchase Promotions," n.d.). One of the advantages of a POP display is the increase in total shelf space. This increase

is directly linked to stronger brand sales (Chandon, Hutchinson, Bradlow, & Young, 2009). The featured brand in the POP display generally sees an increase in sales over then normally shelved brand (Areni, Duhan, & Kiecker, 1999). These strong financial gains lead companies to employ entire design divisions dedicated to POP displays. These display types are described by marketing agencies as below-the-line advertising because they are necessary for driving sales, but do not earn a direct commission for the advertising agencies ("Shopper Marketing Glossary," 2013a).

Generally the POP display is provided by the manufacturer to the store, however they are restocked and maintained by store salespersons. These displays contain heavy branding as they have a large surface area visible to the consumer. Usually they are made of corrugated fiberboard, foam board or a flexible plastic to enable easy design, printing, and disposal ("Shopper Marketing Glossary," 2013d). A POP display is considered a Floorstand or Floor Display, meaning that it is a freestanding merchandiser that was designed to sit directly on the sales floor ("Shopper Marketing Glossary," 2013b).

End cap displays can be simply shelves that the store already has that are assembled on the end of aisles to connect shelves. However more often than not, they are a product display that is built specifically for the end of aisle placement and is a version of a POP display ("Shopper Marketing Glossary," 2013e).

Other types of displays include a pallet display. This kind of display is built on a standard pallet so it ships in the most efficient way and can be rolled out and displayed immediately. A unique advantage of this approach is that they usually come pre-packed from the manufacture and are simply shrink-wrapped to maintain integrity in transit.

Another benefit comes from their often-large graphic panels and distinctive structural design options. One of the structural design choices is a series of stacked trays containing the product that can be removed and thrown away once the product is sold. This update keeps the display appealing to consumers. Most full pallet displays are four sided but half and quarter pallets can be used for different store environments ("Shopper Marketing Glossary," 2013b). Pack-out displays can also be included in this vein. They are folded flat for shipment but are included in the same box as the product straight from the manufacturer ("Shopper Marketing Glossary," 2013b).

Example designs of these display types can be seen in figures 2 and 3 below.

Figure 2. Example of a pallet display created for Coleman sunglasses
Retrieved from Excel Displays and Packaging, 2013, http://www.xlpop.com/portfolio

Figure 3. Example of a freestanding POP display created for Orbit Gum

Retrieved from Excel Displays and Packaging, 2013, http://www.xlpop.com/portfolio

Sustainable Packaging

There are four basic problems dealing with the environment, over consumption, resource utilization, pollution, and over-population (Ljungberg, 2007). These unfortunate,

current trends are pushing companies to reconsider their package's impact on the environment. One method of doing so is to find a way to decrease the amount of packaging material used (Lewis et al., 2007). Packaging engineers are striving towards better ways to decrease the amount of waste material while maintaining the structural integrity of the package (R Hurley & Galvarino, 2012). Sustainable packaging's main goal is to reduce the life-cycle impact of the package while maintaining other important characteristics. The package should be designed for resource minimization, reduced hazards, and recycling purposes (Holdway, Walker, & Hilton, 2002; Zwicker & Antônio, n.d.).

An important factor in sustainable packaging is the materials selection. Production methods, function and structural demands, market or user demands, design, price, environmental impact, and lifetime must all be taken into account (Ljungberg, 2007; Svanes et al., 2010). One consideration that packaging designers make is the ability of the material or substrate to biodegrade. This can be defined as the "ability of a material to be broken down into simpler compounds by microorganisms" ("Shopper Marketing Glossary," 2013a). This would be considered an environmentally preferable product, as it has a lesser effect on human health and the environment (when compared with competing products) ("Shopper Marketing Glossary," 2013e).

The attempt to 'go green' is no longer just an option; it is a necessity for the environment. But fortunately this option can also be good for business (Holdway et al., 2002). Financially, by adopting more sustainable packaging patterns, they will see greater resource efficiency not only in their energy and labor but also in their material

conservation. It also pushes companies to be more innovative with their packaging while making an effort to reduce the environmental impact. Some companies are reluctant because there is a lack of motivation due to unseen commercial benefits, as well as poor strategic planning and lack of resources (Holdway et al., 2002).

Not only does sustainable packaging have a commercial impact, but it also has a large social impact. A huge factor for considering this kind of packaging is the consumer demand. There is a novelty that is associated with this type of packaging that the consumer yearns to learn more about. Companies are making an effort to prey on this emotional factor and impact their purchasing preference. Studies conducted so far show that there is a positive increase in awareness of environmental issues (Nordin & Selke, 2010; van Weenen, 1995).

Eye Tracking

Generally, eye tracking is a research platform in which to non-invasively gather and study eye movements from a subject. There are two basic forms of eye movement that create data that can be tracked and measured. These are 'fixations' and 'saccades.' Fixations are a "pause in the eye movement on a specific visual field and are composed of rapid eye movements, or microsaccades" (Duchowski, 2007). Saccades are made up of "rapid eye movements that occur between fixations when focusing on new stimuli or targets within the field of view" (Duchowski, 2007). Data such as time to first fixation, fixation duration, and overall scan paths can be collected from eye tracking studies. There are two main types of eye tracking techniques. The first measures eye movements in

relation to the head and the second measures eye movements in relation to the space or point of regard (POR) (Young, 1975).

Commonly, eye tracking that uses POR is a video-based corneal reflection tracker. These can either be table-mounted for fixed to a subject's head. The process of corneal reflection is much more practical for interactive use because of its improved accuracy and minimal gear required. It also allows participants to move without restraint while also providing the opportunity for the collection of data (R. a. Hurley, Ouzts, Fischer, & Gomes, 2013; Snyder, 2013).

From this information researchers are able to gather regions of interest. In the packaging world, this information contributes to successful designs for the consumer as it allows the company to deliver what is desired. One method of eye tracking is through head mounted, mobile glasses with cameras fixed on the pupil, recording eye movements. These glasses can produce video scan paths as well as heat maps that further provide researchers with information (Duchowski, 2007).

Research shows that consumers observe a package in a methodical manner from the top left to the bottom right. With these gaze patterns, fixations occur on average of 200-300 milliseconds. Eye tracking is gaining popularity in the packaging design process. Its easy ability to track consumer eye movements as well as fixations helps to evaluate consumer preference. By using the different types of fixation data discussed above, researchers are able to draw conclusions about consumer behavior in retail and other common environments (Pannasch & Dornhoefer, 2001; Snyder, 2013).

CHAPTER THREE

PILOT STUDY

Objectives

The purpose of this research is to determine if a graphically enhanced point of purchase display has a significant impact on consumer purchase decision through preference and attention. Another research objective was to determine if using a point of purchase display to exhibit cosmetic products (compared to the use of traditional blister packages) is more sustainable and environmentally friendly. These objectives will tabulated with an eye tracking study and will be measured by time to first fixation, total fixation duration, fixation count, and ultimate purchase decision.

A pilot study was conducted to preliminarily test the research objectives and helps to determine the best shopping environment. This will aide in better designing the final research experiment.

Participants

The pilot study had a total of 10 participants, all students from Clemson University. The students were all female based on the nature of the product being studied. There was no incentive to participate in the study. It was clear that participation was completely optional and they were able to leave the test or survey at any time. No names were recorded, only an identification number for data collection purposes.

Eye Tracking Equipment

Tobii eye tracking glasses and Tobii recording assistant were used in conjunction with the Sonoco Institute's CU Shop. After the experiment was completed, Tobii Studio was used to organize the data and SPSS was used to statistically analyze the data.

Areas of interest (AOI) were created with the Tobii Studio software. These help organize the targeted areas. Figures 4 and 5 show the AOI's for the pilot study tests.

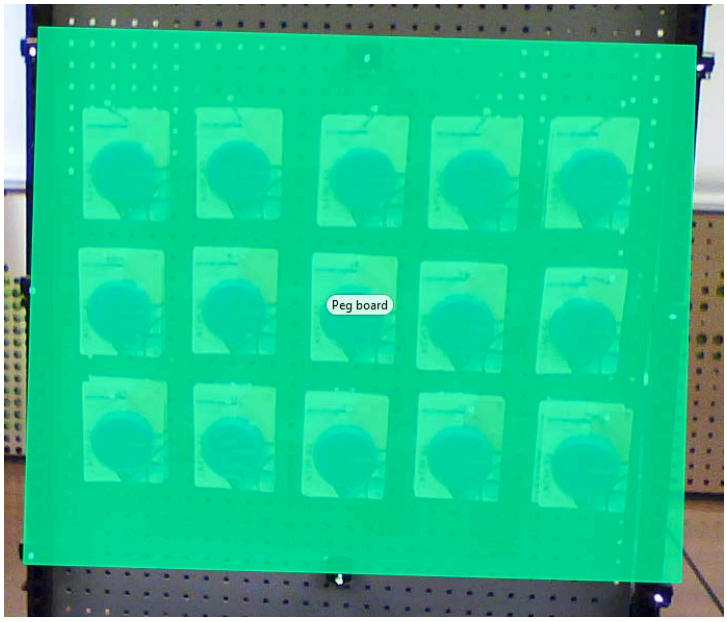

Figure 4. Pilot AOI for Pegboard

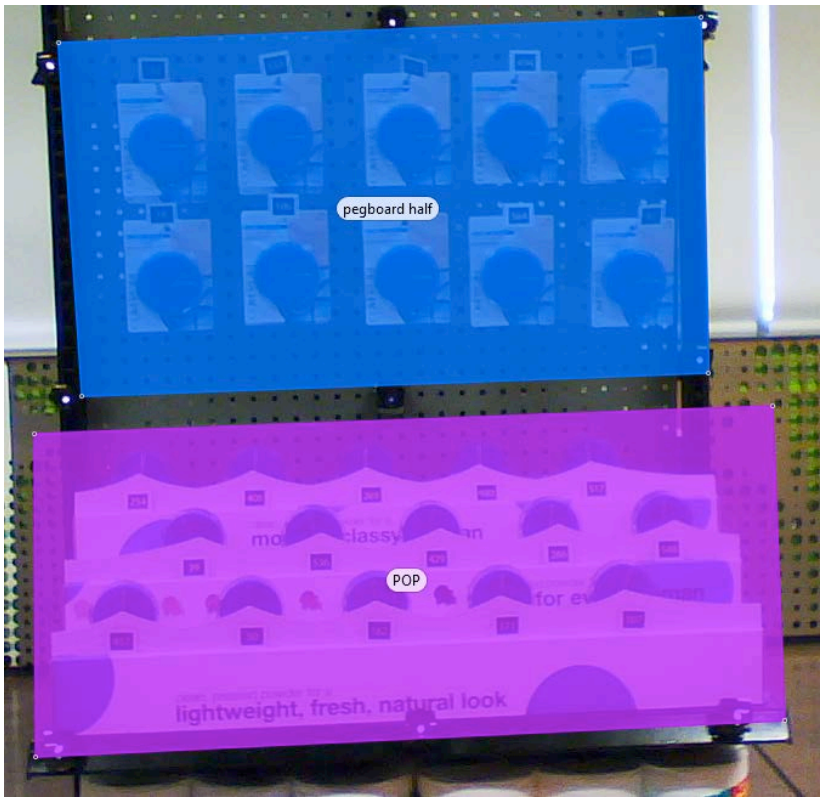

Figure 5. Pilot AOI's for POP vs. Peg Board

Experimental Design and Procedure

Cosmetic packaging was selected due to its common use of blister packaging and minimal use of POP displays. Since there are many brands of makeup, brand loyalty was avoided by only having one brand on display. Ultimately, Cover Girl Oil Control Pressed Powder was chosen and used for this experiment. The Shape of the powder and color of the object worked the best with the experimental design. The experiment was conducted in two parts. The first part of the experiment tested the product purchase decision with the products displayed as they are in store. Product will be displayed at eye level. This can be observed in Figure 6.

The second part of the experiment displayed the products outside of a blister package in a graphically enhanced POP display (Figure 7). This will also be positioned at eye level. (Both are positioned at eye level to create consistency amongst days).

Figure 6. Pilot Peg Board Display (Part 1)

Figure 7. Pilot Peg Board and POP Display (Part 2)

A grocery list was given to participants asking them to shop for the desired cosmetic product and 4 other commodities as not divulge the purpose of the study. Participants were informed about the full time frame of the experiment and requirements of the eye-tracking portion accompanied by an online survey. For the eye-tracking study, participants were be calibrated for the Tobii eye tracking glasses and instructed not to actually touch any of the products. They were handed a shopping list (Figure 6) and told to choose items as they normally would in a grocery store setting. To 'select' an item they were asked to write the corresponding number of the product on their designated shopping list. After completing their shopping in the CU shop they were asked to complete a short online survey using Survey Monkey.

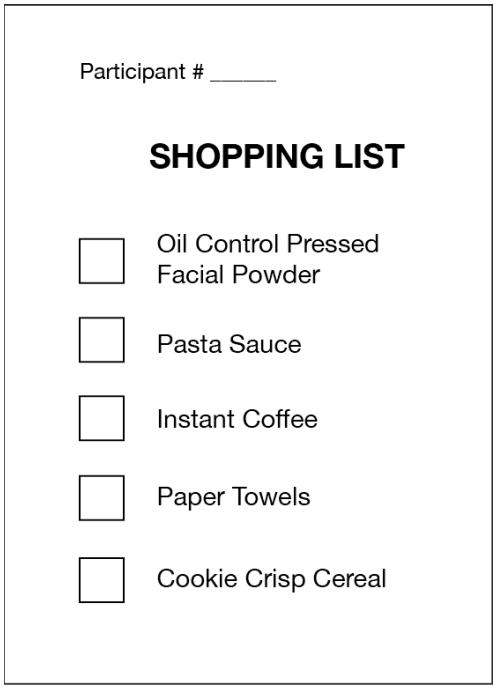

Figure 8. Pilot Study Shopping List

Eye Tracking Metrics

Three eye tracking metrics were collected and analyzed in order to determine the overall success of the designed Point of Purchase Display for cosmetic powder. Collected were time to first fixation (TTFF), total fixation duration (TFD), and fixation count (FC). TTFF and TFD are measured in seconds. The number of fixations within the particular AOI determines FC.

Statistical Analysis

For the collected eye tracking data, independent t-tests were used to compare the data from the two different parts. A 95% confidence interval (alpha value of .05) was used in all listed statistical analyses. The eye movement data was recorded in Tobii Studio and then exported to SPSS software where it was analyzed and recorded in Microsoft Excel. The intent of the statistical analysis for this experiment was to practice and understand which tests would be best for the given data sets.

Eye Tracking Results

Independent t-tests were performed between part 1 and part 2 of the display set up. The results are displayed in Table 1 below. The p value for Time to First Fixation (TTFF) is .174. When compared to the alpha value of .05 the results are not significant. The p value fo TFD is .809. When compared to the alpha value of .05 the results are also not significant. The p value for FD is .802. When compared to the alpha value of .05 the

results are also not significant. These numbers indicate that the top pegboard display was looked at more and with a higher frequency than the POP display.

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
TTFF	Equal variances assumed	.015	.908	1.649	4	**.174**	.61000
	Equal variances not assumed			1.655	2.095	.234	.61000
TFD	Equal variances assumed	1.321	.315	-.258	4	**.809**	-.50250
	Equal variances not assumed			-.212	1.408	.858	-.50250
FC	Equal variances assumed	.706	.448	-.268	4	**.802**	-1.00000
	Equal variances not assumed			-.226	1.462	.848	-1.00000

Table 1. Pilot Study Independent t-test results

As well as numerical data output, Tobii Studios also tracks and exports heat maps. These images show where and for how long the participant looked in a specific area of interest. The warmer the color, the longer the participant stared. The heat map in figure 9 shows dark red spots and more overall color over the blister packages. This indicates that the blister packages were more visually appealing to the consumer than the POP display.

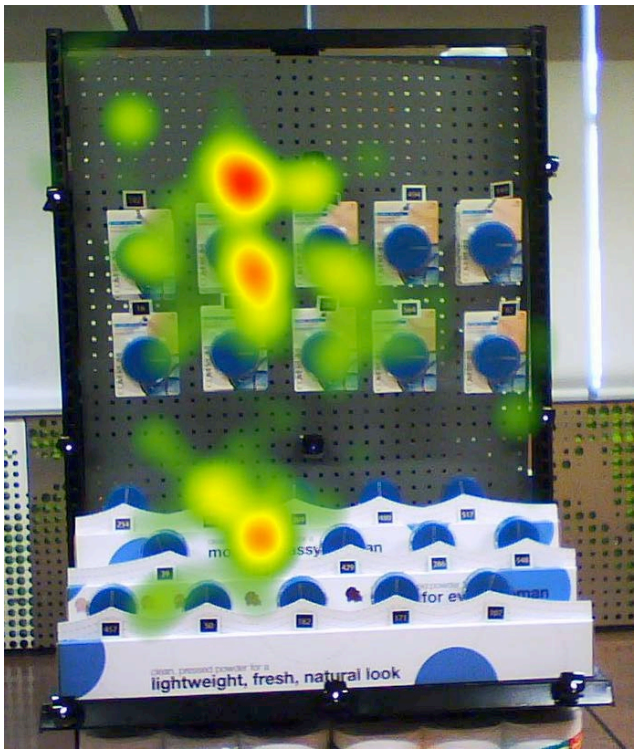

Figure 9. Heat map over POP Display

Survey Results and Statistics

Purchasing decisions were totaled from the shopping lists for the oil control pressed powder. For the first part of the experiment, the only option for participants was in a blister package. This was done for a control portion. For the second part where participants had a choice of packaging types, 4 out of the 5 participants (80%) chose the powder contained within the blister package. Only about 50% of participants from both parts of the study actually wore pressed powder, but all shopped for cosmetic products at least once a month and were mixed as to whether the bought only from a department store or from a drugstore.

Conclusions

The pilot study indicated that powder in the blister packages was more desirable from a consumer purchasing perspective than that displayed in the designed POP display. The results were not statistically significant and the survey monkey results backed up this conclusion.

Though the POP display was not visually desirable, the results from this pilot study will help improve the design and experiment for a larger-scale study. The methodology needs alteration, focusing more on the blister package, not the creative design of the POP display. The display should focus more on the product being displayed without the paperboard backing, not the actual shape and design of the POP display. This can be achieved by using clear trays that are commonly seen in drugstore cosmetic displays. Even though only one brand was used here, there could still be brand bias with Cover Girl Cosmetics. In the next experiment ficticious brands should be designed and used. This will also help to avoid any aesthetic bias with participants.

Furthermore, a larger-scale study with more participants will allow more concise conclusions to be drawn. Using a sample size n=10 was not large enough to see anything in the statistical output. A wider age and demographic range of female participants will also help the study. The specific anaysis for the next data set should use paired t-tests if the participants are seeing the different display types at the same time in the experiment.

In future studies, if the POP display is found more desirable than the blister package, it will eliminate the need for paperboard backing. This will have a significant impact on reducing packaging waste for the consumer and company.

CHAPTER FOUR

MATERIALS AND METHODS

Objectives

The purpose of this research was to determine if there was a significant difference in consumer preference, relating to purchase decision, between cosmetic pressed powder packaged using a paperboard backing and a pegboard versus powder that was displayed without. This study utilized eye-tracking technologies to gather data for statistical analysis.

Figure 10. Images of Pressed Powder Samples

Retrieved from Amazon, 2015, http://www.amazon.com/CoverGirl-Control-Pressed-Powder-0-35-Ounce/dp/B002VECKHO

Participants

For this experiment, eye-tracking data from 102 female participants was used in accordance with IRB regulations. The study took place over the course of four days at the PackExpo convention in Chicago, IL. Each participant was given an identification number for survey reference purposes; this number was not linked to the individual's personal identification in any way. Due to the inherent gender association of the product, this study was screened for female participants only. There was no monetary incentive to complete the experimental study. Each participant was informed their participation was completely optional and they could leave the study at any time.

Stimulus Package Design

After conducting the pilot study with Cover Girl cosmetics, it was determined that there could be a possible brand loyalty with the shopper. In order to avoid this bias, two fictitious brands were created to fit the unmarked powder samples, Wild and Celeste. The designs were created to be completely different visually in order to differentiate product location on the shelf. Each brand sample needed a paperboard backing for the powder as well as tray inserts and backing. All of the designs were created in Adobe Illustrator CS5, printed on the 12-point solid bleached sulfate (SBS) paperboard using a Roland VersaUV LEJ-640. The designs were then cut on an Esko Kongsberg iXLL44. In order to create a shelf presence similar to brands commonly seen in drugstores, clear acrylic trays were purchased from Bed Bath and Beyond and were used to hold the unpackaged powder

samples. The signs for the trays were covered with clear acetate. The created designs can be seen below.

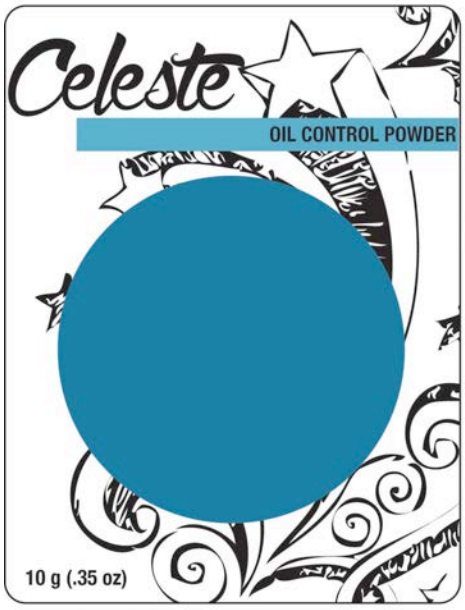

Figure 11. Celeste Design for Paperboard Backing

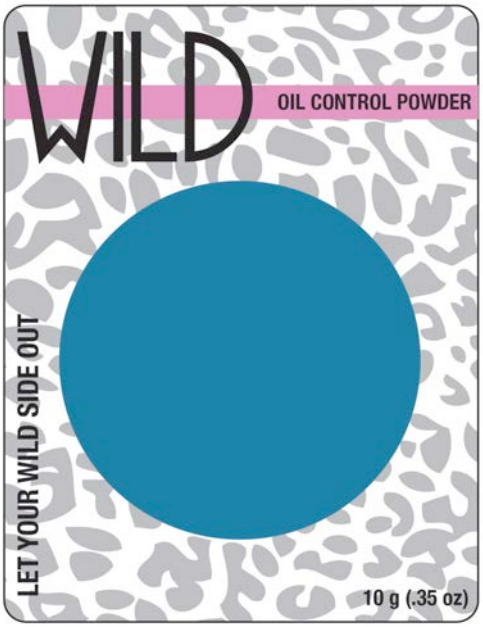

Figure 12. Wild Design for Paperboard Backing

Figure 12. Celeste Design and Layout for Tray Samples

Figure 13. Wild Design and Layout for Tray Samples

After creating and manually assembling the powder samples, they were ready to be set up in the simulated retail environment at PackExpo Chicago.

Stimulus Display Design

The purpose of this experiment was to evaluate if unpackaged cosmetic pressed powder changed consumer preference compared to the commonly seen paperboard backing. Fictitious brands were created but in order to avoid a bias between the designs, the brands needed to be switched between participants. Celeste appeared on the paperboard backing and Wild appeared on the trays for the first round of participants. Then, they were switched so that Wild appeared on the paperboard backing and Celeste appeared on the trays. This helped eliminate any aesthetic bias between the shelf displays.

Eye Tracking and Apparatus

In order to record eye movements of participants in the study, Tobii eye tracking glasses were used. These glasses have a camera focused on the right eye for video based corneal reflection. They have a sampling rate of 30 Hz. The glasses attach to the Tobii Recording Assistant, which gathers and stores the eye-tracking data and video of the participant's visual field onto a SD card where the data can be later extracted.

Figure 14. Tobii Eye Tracking Glasses and Recording Assistant

Retrieved from Tobii, 2015, http://www.tobii.com/en/eye-tracking-research/global/products/discontinued-products/tobii-glasses-eye-tracker/

The glasses and recording assistant rely on Infrared (IR) markers that are mounted on the shelf in order to establish an area of analysis (AOA). The IR markers are also used to calibrate the Tobii glasses specific to each participant. An area of analysis is defined as "as 2D plane created by the placement of four or more IR markers" (Snyder, 2013).

Figure 15. Tobii IR Markers

Retrieved from Tobii, 2015, http://www.tobii.com/en/eye-tracking-research/global/products/discontinued-products/tobii-glasses-eye-tracker/

Within the established AOA is an area of interest (AOI) that helps with the analysis of specifically targeted items on the store shelf. To create a specific AOI that Tobii recognized, a 'snapshot' must be taken before data can be collected. Essentially, a picture is taken with the Tobii glasses, to highlight the specific AOI within the referenced IR markers.

Figure 17. AOI Top Display Location Diagram

Figure 18. AOI Bottom Display Location Diagram

Calibration

For each participant, the glasses must be adjusted and calibrated using the IR markers. Participants were asked to put the glasses on their face and adjust the cord on the back as necessary. It is important that that the participant feels comfortable with the glasses so they do not distract from the shopping experience. Once the glasses are adjusted, the experimenter holds an IR marker up against the blank wall, approximately one meter away from the participant. This allows the Tobii glasses to find the location of the participant's right pupil. Once the pupil is located, the Tobii Recording Assistant displays a 3 x 3 reference grid for the experimenter. The participant is asked to remain

still as the experimenter moves the IR marker along the wall mirroring each reference point in the 3 x 3 grid. This helps to align and track the participant's pupil during the experiment in the different AOI's. After the grid was accepted by the recording assistant, the participant was asked to look directly ahead while the experimenter holds up an IR marker. This locks in the placement of the participant's pupil. After these steps were carefully completed, the experimenter pressed the 'record' button on the Recording Assistant, beginning the data collection for the specific participant.

Experimental Design

In order to gather the largest and most diverse pool of participants, the experiment was run during PMMI's PackExpo in Chicago, IL in Clemson University's simulated grocery store, CU Shop. Clemson's booth boasted over 1,000+ square feet. (See Figure 16 below.) Within the booth, a separate 19 x 24 foot room was designed to simulate a realistic shopping environment. The grocery store set up at PackExpo contains gondola shelving, 2 end caps, and carefully placed signage to denote a specific aisle's contents. Pricing is eliminated in the study and price tags are replaced with randomized number tags corresponding to each product. Prices are removed so that participants are not tempted to select a product based on price. This eliminates a possible variable from the study and allows participants to evaluate the products based on their packaging appeal. The participants are giving a shopping list and asked to shop as they normally would for a product. To 'select' an item, the participant is asked to write down the corresponding number on their designated shopping list. Participants are instructed not to physically

touch the products in the grocery store. The items on the shopping list are randomized for each participant. Organized on an end cap, the cosmetics display was surrounded by other toiletry-like products in order to create a cohesive shopping environment.

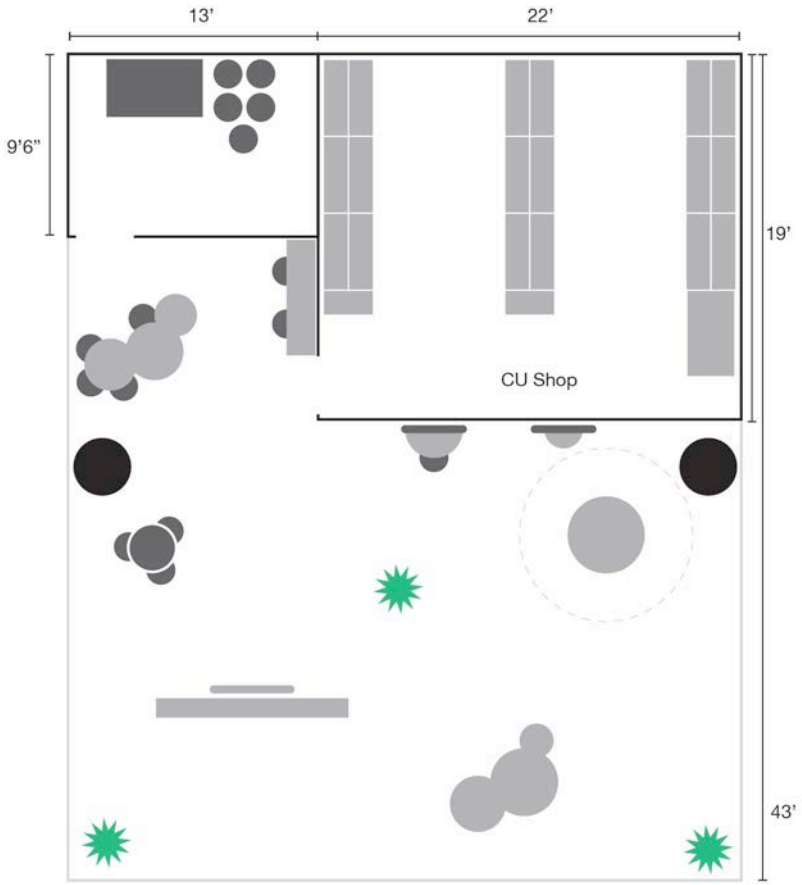

Figure 19. PackExpo Floor Plan

Two fictitious brands were created and used, Wild and Celeste. Avoiding aesthetic bias was important in the design. There were four days of data collection. On day 1, Wild was set up on the peg board and the powder was arranged in the paperboard backing. Celeste was set up below the pegboard in the clear acrylic trays with Celeste

information displayed around the product. Days 2-4 reversed the set up so that Wild was positioned on the acrylic trays below the pegboard. Celeste was arranged above the trays on the pegboard with the powder in paperboard backing.

Figure 20. Day 1 Product Arrangement

Figure 21. Day 2 Product Arrangement

Procedure

After agreeing to participate in the study, each participant was informed the study would take no more than 15 minutes and that they could leave the experiment at any time. They participant was instructed to follow the experimenter to the calibration area. After a successful calibration with the Tobii eye tracking glasses, the experimenter showed the participant into CU Shop, handed them the shopping list (pictured below), and explained how to select an item without touching the items on the shelves. After the participant completed their shopping list they were asked to take a short survey on the provided computer (using the website, survey monkey) relating to demographics of the

participant as well as the participant's item preferences. This allowed researchers to add another layer of information to the already collected eye tracking data.

Figure 22. Shopping List Provided to Participants

Eye Tracking Metrics

Three eye tracking metrics were chosen for further examination out of Tobii Studio; these metrics helped study the preferences of the participant. Time to first fixation (TTFF), fixation count (FC), and total fixation duration (TFD) were collected. TTFF is measured in seconds and is defined as the "time it took the first participant to first fixate on an AOI after entering the surrounding area" (Snyder, 2013). FC is the total number fixations from a participant on a specific AOI. Also measured in seconds, TFD is the total time that a participant was fixated on a specific AOI. These metrics are important, as they

are the base data for the conducted research, allowing researchers to quantify the shopping experience of the participant.

Statistical Analysis

The data collected on all four days of the experiment was exported out of Tobii Studio and organized in Microsoft Excel. The eye tracking data was separated based on the product location arrangement. Day 1 was separated from days 2, 3, and 4 because of the reversed placements of Wild and Celeste. The data was also separated into the various eye tracking metrics (TTFF, FC, TFD). The eye tracking data was then imported into SPSS and an independent t-test was performed on each of the metric groups of data. The results of the t-tests were examined with a 95% confidence interval (alpha value of .05) to determine if there was significance between the days. If no significance was found between the grouping of days, all of the data could be pooled together and further examined. The pooled data would be examined with paired samples t t-tests per metric grouping to determine if there was a significant difference in display types for the cosmetic pressed powder.

CHAPTER 5

RESULTS AND DISCUSSION

There were 102 total participants in the study; all were female and attendees of the 2014 PMMI PackExpo in Chicago, IL. Female participants were important because the cosmetic product of interest is usually targeted for female consumers. Participants with weak calibration scores were discarded along with survey results that did not answer within the given parameters. Calibration errors can occur due to a wide range of factors such as the participant's facial shape and features or if a participant wears glasses or other corrective vision measures.

The eye tracking data was recorded in Tobii Studio, then exported and organized in Microsoft excel and finally analyzed in SPSS. The analysis in SPSS was conducted with a 95% confidence interval (alpha value of .05).

Eye Tracking Results and Statistics

In order to correctly analyze the data, it must be determined if there was any significance between the shelf/brand placement. The data was split between top pegboard display and bottom tray display by periods. Each period for each metric was also split and organized, leaving 6 different metrics for comparison as seen below.

1	TTFF Top for Period 1	TTFF Top for Period 2
2	TTFF Bottom for Period 1	TTFF Bottom for Period 2
3	TFD Top for Period 1	TFD Top for Period 2
4	TFD Bottom for Period 1	TFD Bottom for Period 2
5	FC Top for Period 1	FC Top for Period 2
6	FC Bottom for Period 1	FC Bottom for Period 2

Table 2. Metrics Organized by Period

Each metric was compared using an independent t-test in SPSS. This test was use because the same person did not view the same samples since they are in separate time periods. The p-values can be seen in the chart below.

1	**TTFF Top**	0.853
2	**TTFF Bottom**	0.165
3	**TFD Top**	0.331
4	**TFD Bottom**	0.107
5	**FC Top**	0.334
6	**FC Bottom**	0.035

Table 3. Separated P values for Top and Bottom Metrics

There was significance between metric 6, bottom fixation count so the periods could not be combined and the data needed to be processed separately. Using SPSS again, the metrics were compared to each other using a paired samples t-test. This was chosen because each participant saw both sample arrangements at the same time. The p-values can be seen below.

1	TTFF Period 1	0.448
2	TTFF Period 2	0.343
3	TFD Period 1	0.169
4	TFD Period 2	0.283
5	FC Period 1	0.072
6	FC Period 2	0.602

Table 4. Seperated P-values for FC, TTFF, and TFD

Figure 23. Display Diagram

As seen in the chart below, there was a higher fixation count on the top pegboard (11.3462) compared to the bottom trays (6.3929) for period 1. Period 2 showed a higher fixation count for the bottom trays (9.7321) versus the top pegboard (8.9649). This could be attributed to the familiarity of the pegboard and paperboard displays versus the clear acrylic trays. The consumer may also be accustomed to selecting a product from the top of a display, regardless of other product placement. The p values shown in the above table show that there is no significance that the bottom display was looked at more than the top display.

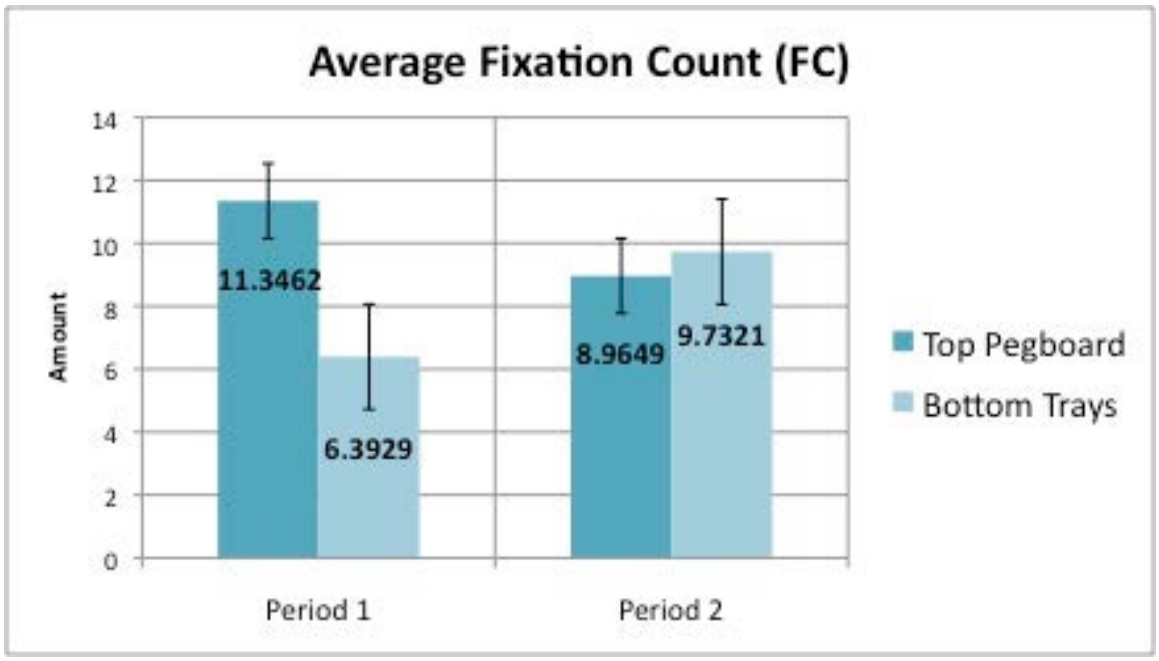

Figure 24. Chart of Average Fixation Count

The average Time to First Fixation for the top pegboard was lower than that of the bottom trays meaning that the participants looked at the top pegboard more quickly (1.7957 seconds) than they looked at the bottom trays (2.2075 seconds) in period 1. Period 2 indicated a slight reverse as the top pegboard had a higher TTFF (1.8136 seconds) versus the bottom trays (1.6950 seconds). This could also be attributed to familiarity with the pegboard and paperboard packaging style. The p values are still not significant, however is very close to significance. If a larger confidence interval was used (alpha value of .10) , significance could be seen in the time to first fixation. It is important to note that the p-value is close to significance; the bottom trays were looked at almost as quickly as the top pegboard display.

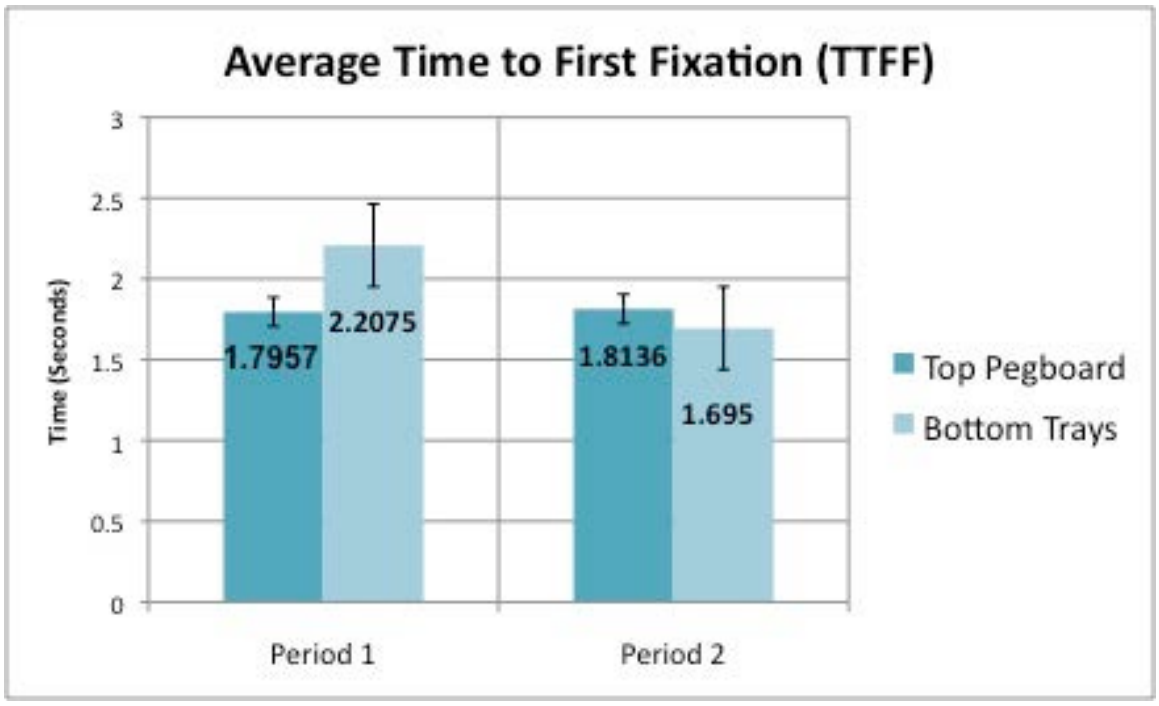

Figure 25. Chart of Average Time to First Fixation

The average total fixation duration is lower for the bottom trays (0.9939 seconds) than for the top pegboard with paperboard backing (1.6886 seconds) in period 1. Period 2 shows a reverse again, with the top display having a lower TFD (1.2289 seconds) compared to the bottom trays (1.8754 seconds). This means that the majority of participants focused on the top pegboard for longer than they did on the bottom trays. Again, familiarity with packaging styles could play a role in the fixation duration. Participants are searching for a product and often are drawn to what they already know and see commonly in drugstores. Another discrepancy is the physical location of the products; participants may not be familiar with shopping for a cosmetic product in a grocery-like environment. Also, the samples were located on an end cap display and not on a standard grocery aisle.

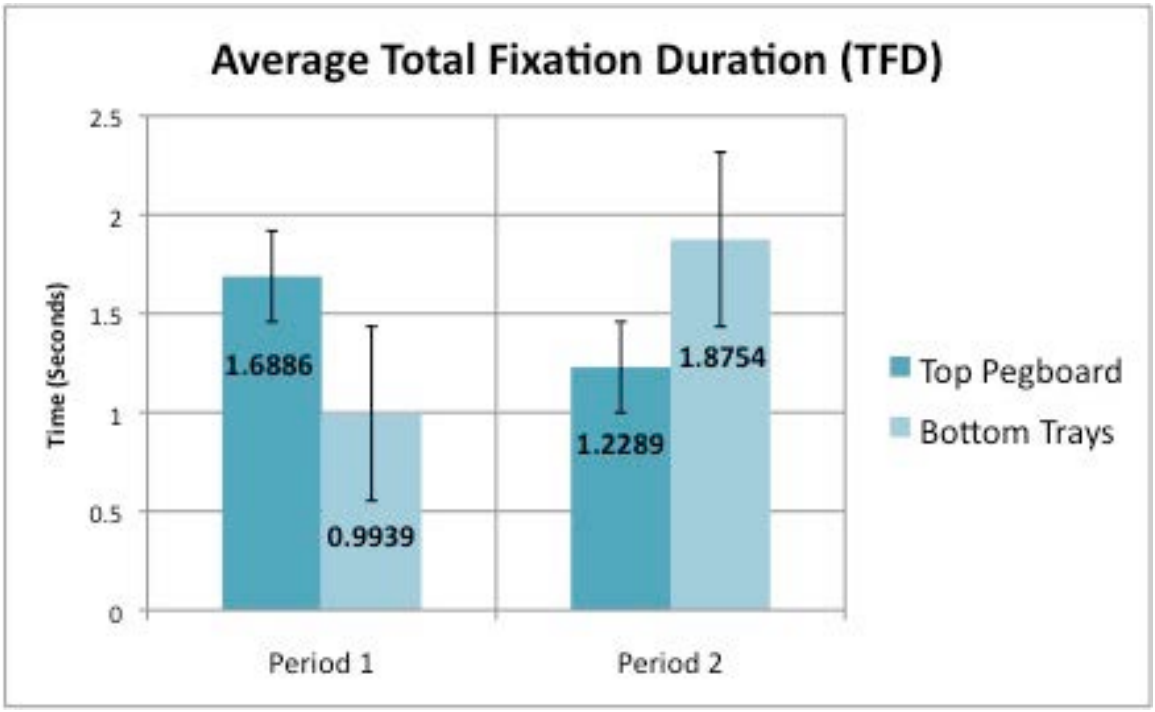

Figure 26. Chart of Average Total Fixation Duration

Tobii Studio collects not only raw data that can be statistically analyzed, but the program also captures images of the participant's point of view. These images include heat maps and gaze plots. Heat maps show where the participant is focused and use color to indicated how long the participant stared at a specific AOI. A warmer color indicates that the participant's gaze lingered, while just glancing over an object within the AOI will show a greener color. Gaze plots are similar in content, however they display the information much differently. Using circles connected by lines, the gaze patterns of the participant are gathered. This shows where the participant looked around the AOI's.

Though there was not significance between the top paperboard samples and the bottom clear strays, statistically speaking, gaze plots indicated that participants did not over look the trays completely. As seen in figure 27 (shown below), this participant spent

a significant amount of time reviewing the information given with the bottom tray design. This participant also viewed both display types before moving on to the next item in the store. This kind of information display is helpful because it highlights where participants are looking on a graphic display, allowing the least viewed areas to be improved instead of changing an entire design completely. This improvement in experimental design can be seen between the original pilot study conducted and the research conducted in the full experiment.

Figure 27. Sample Gazeplot of Experiment Display

Heat maps also indicate that participants paid attention to the bottom tray display as well. Figure 28 (seen below) show darker areas over the bottom tray display. This

indicates that the participant was spending more time looking at those areas. These heat maps, like the gaze plots, show that the participant evaluated both of the display types before moving onto the next item on their list. However, heat maps are aggregate, meaning they include an average from all participants. Gaze plots are limited to one participant.

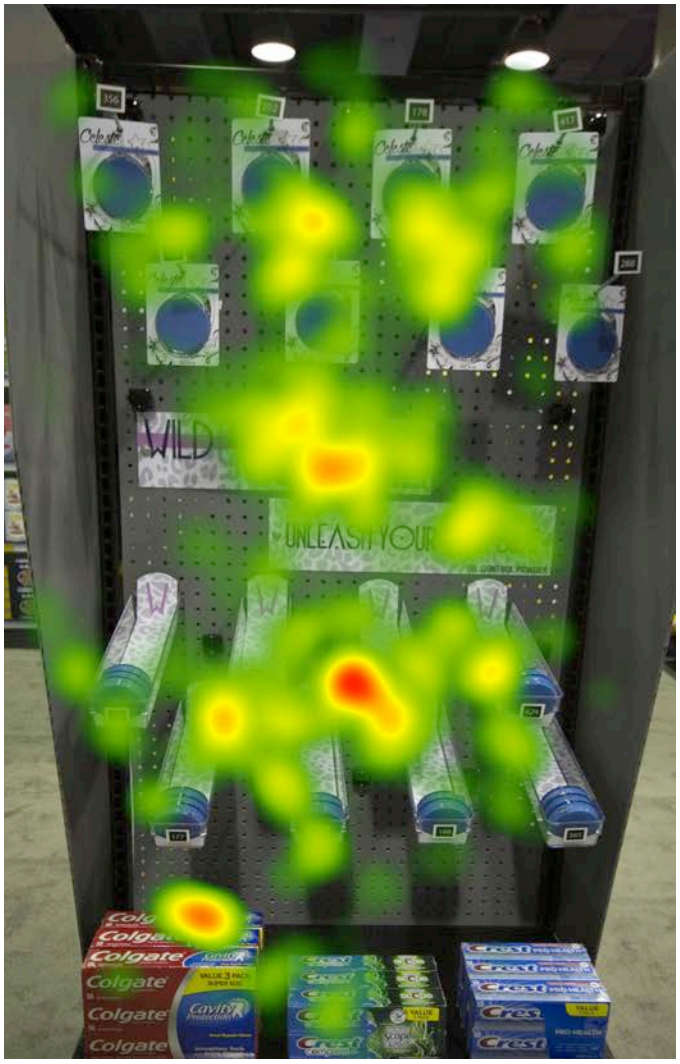

Figure 28. Heat Map of Experiment Display

Survey Results

Survey Monkey was used to ask and gather demographic and preference questions from each participant after they completed their shopping experience in CU Shop. Relevant questions to this study included:

- How old are you?
- Do you shop for pressed powder?
- Do you typically buy makeup from a department store or drug store?
- Do you feel that the shelf display of makeup impacts your purchase decision?
- Would minimal packaging (less paper/plastic around the product) appeal to you as a consumer?
- Would less packaging deter you from purchasing a beauty/cosmetic product?
- What brand of pressed powder did you choose?
- Was your chosen powder in a clear tray of handing with a paper backing?
- Did you feel as though both of the pressed powders were equal in shelf presentation?

The majority of participants were between the ages of 21-29 with the 30-39 year old age group close behind. Only one participant was older than 65 and only 6 participants were younger than 17. More than 60% of the participants indicated that they do not shop

regularly for pressed powder. This could have a direct effect on responses, as some women do not wear this particular cosmetic product. Also, when asked where they typically buy makeup from, the majority of participants responded that they prefer to buy makeup from a department store. Since the powder was set up in a grocery/drug store environment, this could have had a negative impact on displays in the eyes of the participant.

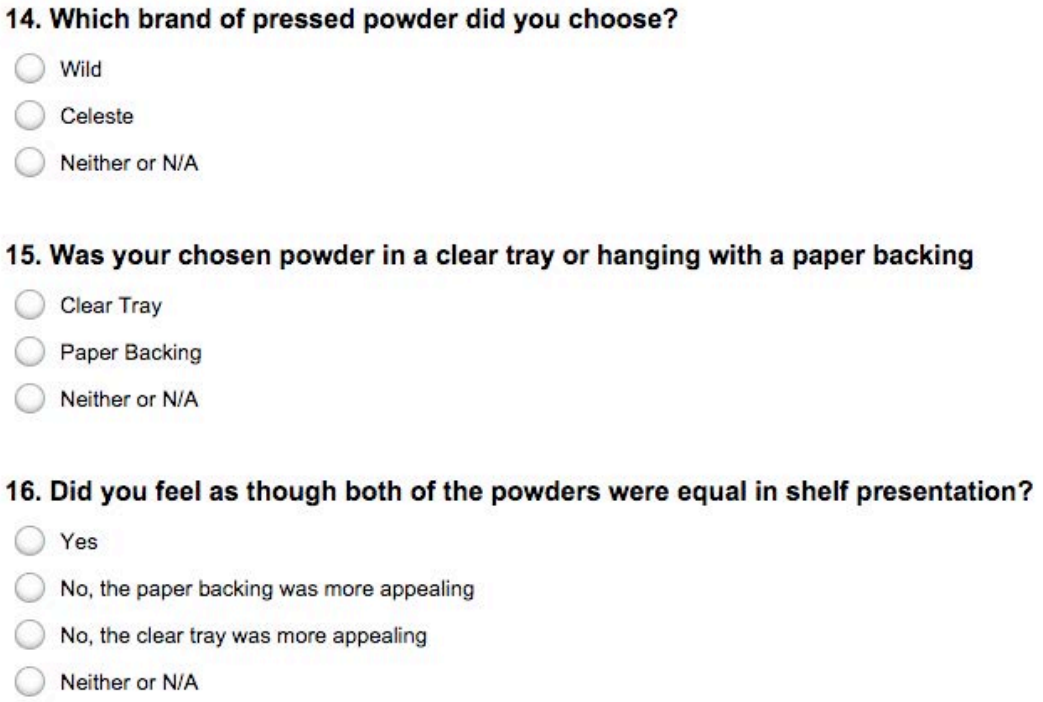

Figure 29. Screen Shot of Survey Monkey Screen for Participants

Over 50% of participants indicated in the survey that the shelf display of makeup does impact their purchase decision. When asked if minimal packaging would appeal to them as a customer, 56.32% of participants responded 'yes.' 78.41% of participants also indicated that less packaging would not deter them from purchasing a cosmetic product.

These are important majorities, as they highlight that minimal packaging would not affect the purchase decision.

From a corporate perspective, minimal packaging would reduce waste of precious commodities such as paper and kraft board. It would also contribute to different but possibly more effective distribution techniques, as the product could be more closely packaged together in boxes and subsequently on pallets. On the consumer's end, less packaging would mean less hassle to access the product and less overall waste. From both perspectives, this change would allow for less waste in landfills over time.

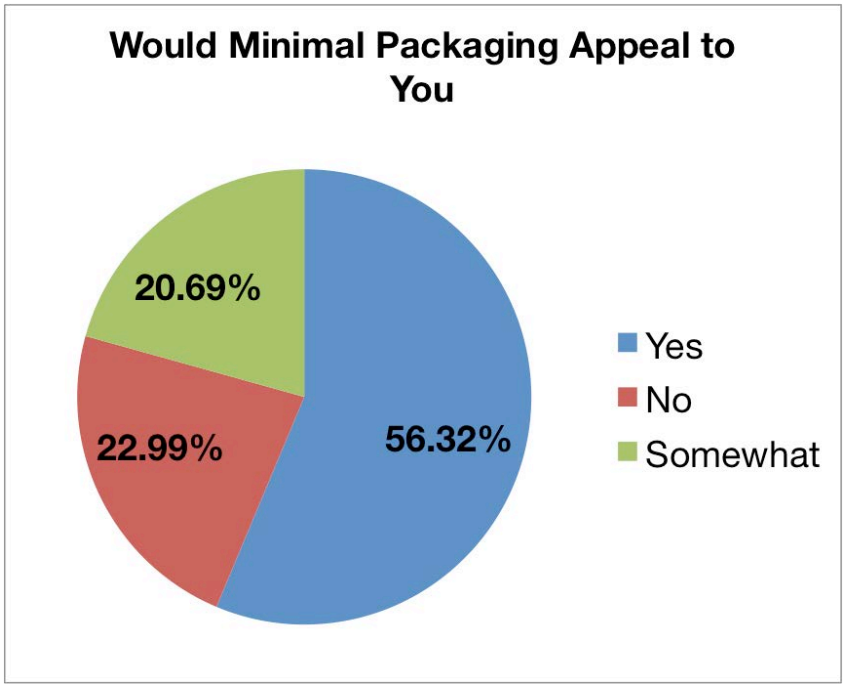

Figure 30. Pie Chart of Minimal Packaging Survey Question

Participants were asked which brand of pressed powder they chose- after eliminating the 'neither or N/A' responses it was determined that 51.47% chose celeste and the remaining 48.53% chose Wild. This, accompanied by the lack of statistical

significance discussed earlier, proves that there was no brand loyalty or aesthetic bias between the two brands and the creation of the two fictitious brands was successful.

68.75% of participants indicated that they chose the powder that was in paperboard backing. This could be due to a preconceived scan path of the participant. For example, the participant is always used to choosing their cosmetic product on the top row or shelf, leading them to choose the product here that was displayed on top. There could also be a familiarity with the paperboard backing style displayed in the experiment. Most pressed powder samples in drug stores are found displayed in this packaging style.

An important preference question dealt with the shelf presentation of the different display types. 44.61% of participants indicated that the paperboard backing was more appealing while 24.62% noted that the clear tray was more appealing. This left 30.77% of participants who thought that the clear trays and the paperboard backing were equal in shelf presence. Combined, 55.39% of participants were satisfied with the product displayed in the trays. Slightly more than half of the participants noted that the shelf presentation was equal or greater for the trays.

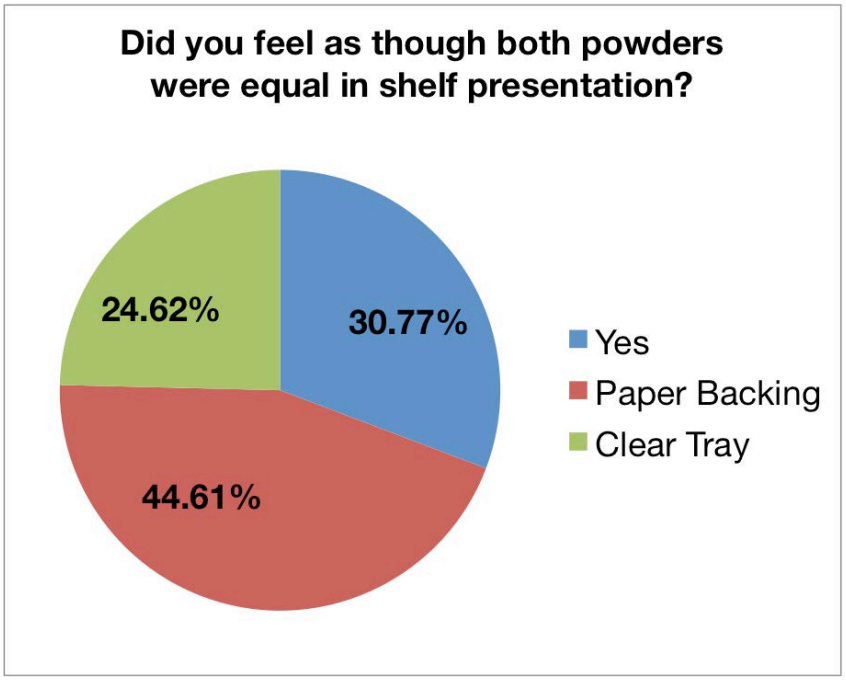

Figure 31. Pie Chart of Shelf Presentation Question

Survey results are important to a study because they give researchers extra information outside of the quantitative data that was collected. These survey results were important because they tell a different story than the statistical data. Participants were able to clearly state how they felt about packaging in general as well as the packaging that was being studied in this experiment. The qualitative results allow researchers to draw more concise conclusions.

CHAPTER 6

CONCLUSIONS

Concluding Remarks

There are many different forms of packaging pertaining to cosmetic products as well as different retail environments. Display types vary from blister packages with pegboard display to standard shelf displays to point of purchase displays. Most commonly in drugstores, pressed powder is found in a blister package with paperboard backing. These powder samples are generally displayed on a pegboard wall with space in between each item. Though frequently used, this form of packaging may not be the most ideal in terms of consumer preference relating to purchase decision and the amount of waste after product is extracted. Furthermore, this may not be the most efficient way to use precious shelf space to display the product.

This experiment aimed to test the effectiveness of paperboard backing in the display of cosmetic pressed powder. To avoid any brand bias, two fictitious brands were created and tested in an immersive retail shopping experience, CU Shop at PMMI's Pack Expo 2014 in Chicago, IL. Through the use of Tobii eye tracking technologies, data was collected using Tobii Studio and analyzed using SAS to compare the different display types of the powder samples. This data creates a better understanding of the various shelf display types and the impact of packaging on the consumer purchase decision.

The hypothesis hoped to prove that packaging displayed in a POP-like tray was just as likely, if not more, to be chosen than the powder displayed with traditional paperboard backing. This research concluded that even though cosmetic pressed powder

displayed with a paperboard backing is more commonly chosen, it may not be necessary for consumers anymore. There was no statistical significance ($p>.05$) from this experiment that the powder displayed without the paperboard backing is more popular in the eyes of the participant. The time to first fixation and total fixation duration were longer and lower respectively for the bottom trays. The average fixation count for the bottom trays was also lower than the powder displayed in the top paperboard backing. However, survey results indicated that minimal packaging does not deter consumers. Participants also indicated that they did not think the POP had significantly less shelf presence. Also, participants described that shelf presence and design does affect their purchase decision.

All three eye tracking metrics showed that consumers instinctively went to the paperboard backing first. This could be due to preconceived gaze patterns or familiarity with the packaging style. However, gaze plots and heat maps extracted from Tobii Studio highlighted that the participants scanned both shelf display types equally before making their purchase decision. This proves participants are not disregarding the product with less packaging. Survey results also indicated that participants did not feel that the bottom trays lacked in shelf presence. Enough participants selected they felt the trays were equal if not more prominent in shelf presentation than the powder displayed with the paperboard backing.

The methodology developed in this experiment could lead to further eye tracking research pertaining to different display types in an effort to eliminate waste and paperboard backing. The results from this study were not statistically significant however

they establish a precedent with the consumer survey results to continue researching the necessity of paperboard backing on cosmetic pressed powder. There are several limitations of this study, including the use of only one product and the self-designed packaging. This experiment could also be expanded to include other forms of cosmetics or consumer goods in different retail environments where both male and female participants are evaluated.

Future research could also use different sineage to prime participants into thinking about the impact of less packaging. This could be used to see how the display type could change a consumer's mind about a specific style of packaging.

CHAPTER 7

RECOMMENDATIONS

This study was limited to just one cosmetic product, pressed powder. However, future studies relating to the elimination of paperboard backing could use a similar methodology to extend the bounds of this research. Eye tracking technologies could still be used to evaluate the effectiveness of paperboard backing and blister packages in a retail environment. Another consideration is the specific retail environment, whether it emulate a drug store, grocery store, or department store.

Other limitations included the survey set up. Participants were not shown the packaging styles again during the survey, this could have influenced the number of neither/non-applicable responses about which product was chosen. Particpants also should have been asked directly if they were familiar with the brands presented. The question asking if 'less packaging would deter you from purchasing a cosmetic product' was too broad across the field of cosemetic products. It should have been more restricted to the product being studied.

Further limitations included the set areas of interest. They were large rectangles aroud the different package designs, however there was a significant amount of 'dead space' included. Other research could use more targeted AOI's.

This experiment could be varied to include different display types that are not just restricted to an end cap display. Modifications to the research questions would also be a consideration, such as the effect of shelf height or placement in a store. Furthermore, this

research could be expanded to include other products outside of cosmetics that are typically found in blister packages. Since this research experiment was restricted to female participants only, further research could open up to male participants in studies of different products.

APPENDICES

Appendix A

Raw Eye Tracking Data and Survey Results

Participant #	TTFF Top	TTFF Bottom	TFD Top	TFD Bottom	FC Top	FC Bottom
6AW	0.12	7.72	1.2	1.3	10	7
9AW	-	0.12	-	0.58	-	3
8AW	6.58	4.35	5.32	1.87	35	12
13AW	-	-	-	-	-	-
19AW	7.62	5.88	0.37	0.87	2	6
20AW	1.35	0.35	0.3	1.13	2	11
21AW	1.58	0.28	0.8	0.07	7	1
22A	-	-	-	-	-	-
24AW	2.02	5.98	1.83	0.3	14	2
25AW	0.45	-	0.23	-	2	-
28AW	1.15	0.28	0.77	0.37	7	4
30AW	0.55	1.18	1.52	0.8	8	5
31AW	1.18	0.02	0.2	6.9	2	33
32AW	0.58	1.58	0.4	0.23	3	3
33AW	1.02	1.88	2.68	0.53	24	5
34AW	0.25	0.72	0.62	0.17	3	2
38AW	1.52	0.12	2.8	1.72	21	12
39AW	-	-	-	-	-	-
40AW	0.62	5.32	0.6	1.63	6	9
41AW	1.12	1.22	0.6	0.3	6	1
45AW	0.82	0.45	5.35	1.13	27	10
46AW	0.78	3.82	1.2	1.33	8	8
51AW	7.12	6.25	0.73	1.98	6	15
55AW	-	0.45	-	1.12	-	4
56AW	0.82	1.15	3.27	0.1	22	1
57AW	0.75	1.62	0.52	0.53	5	3
58AW	2.88	0.15	9.3	1.1	45	8
60AW	2.22	2.05	0.37	0.23	4	2
66AW	0.18	0.35	2.13	0.9	15	6
67AW	1.12	4.62	0.6	0.37	7	3
68AW	4.95	1.32	0.07	0.07	1	1
69AW	0.65	-	0.13	-	2	-
75AW	0.28	2.58	3.37	0.2	17	2
1BW	1.05	2.42	2	1.23	10	6
2BW	0.55	3.52	0.07	0.67	1	6
3BW	0.58	3.32	2.17	1.3	10	9
4BW	0.15	0.12	2.47	1.07	12	8
5BW	1.32	3.28	2.37	0.77	16	6
6BW	1.45	5.78	1.83	0.55	8	5

11BW	0.35	0.22	1.77	8.4	13	32
12BW	0.95	0.12	0.48	0.7	2	7
13BW	0.62	1.62	2.07	2.32	17	11
14BW	6.95	-	0.23	-	3	-
16BW	9.08	1.25	0.2	3	2	17
17BW	1.32	-	0.48	-	5	-
21BW	5.85	1.02	0.13	1.27	1	9
33BW	3.35	5.38	0.33	0.07	3	1
35BW	1.95	0.15	0.98	1.53	6	11

Participant #	**Age**	**Relationship**	**Education**	**Income**	**Primary Shopper**
6AW	40-49	Married	Bachelors	200,000+	Sometimes
9AW	50-59	Married	No Degree	100,000-149,000	No
8AW	50-59	Married	No Degree	100,000-149,000	Yes
13AW	21-29	Single	No Degree	Less than 20,000	yes
19AW	21-29	Single	No Degree	Less than 20,000	Sometimes
20AW	21-29	Single	No Degree	Less than 20,000	Sometimes
21AW	21-29	Single	High School	Less than 20,000	No
22A	21-29	Single	No Degree	20,000-34,999	No
24AW	50-59	Single	Graduate Degree	50,000-74,999	Yes
25AW	-	Married	Graduate Degree	35,000-49,000	Sometimes
28AW	21-29	Single	Bachelors	50,000-74,999	Yes
30AW	21-29	Single	Bachelors	100,000-149,000	Yes
31AW	21-29	Single	High School	200,000+	No
32AW	18-20	Single	No Degree	50,000-74,999	No
33AW	30-39	Married	Bachelors	150,000-199,999	Sometimes
34AW	17/younger	Single	Less than HS	50,000-74,999	No
38AW	18-20	Single	No Degree	Less than 20,000	Yes
39AW	21-29	Single	No Degree	Less than 20,000	No

40AW	18-20	Single	No Degree	50,000-74,999	Sometimes
41AW	17/younger	Single	Less than HS	Less than 20,000	No
45AW	30-39	Single	Associate	75,000-99,999	Yes
46AW	30-39	Single	Bachelors	50,000-74,999	Yes
51AW	40-49	Married	Bachelors	150,000-199,999	Sometimes
55AW	50-59	Married	Bachelors	200,000+	Yes
56AW	21-29	Married	No Degree	20,000-34,999	Yes
57AW	30-39	Married	Bachelors	150,000-199,999	Yes
58AW	21-29	Single	No Degree	Less than 20,000	No
60AW	21-29	Married	Graduate Degree	100,000-149,000	Yes
66AW	30-39	Single	Bachelors	75,000-99,999	Sometimes
67AW	21-29	Single	No Degree	50,000-74,999	Yes
68AW	21-29	Single	No Degree	Less than 20,000	Yes
69AW	21-29	Single	No Degree	Less than 20,000	Yes
75AW	18-20	Single	No Degree	75,000-99,999	No
1BW	30-39	Married	Graduate Degree	150,000-199,999	Sometimes
2BW	60-64	Married	No Degree	200,000+	Yes
3BW	18-20	Single	No Degree	150,000-199,999	Sometimes
4BW	18-20	Single	No Degree	Less than 20,000	Sometimes
5BW	21-29	Single	No Degree	150,000-199,999	No
6BW	30-39	Married	Bachelors	100,000-149,000	Yes
11BW	40-49	Single	Graduate Degree	50,000-74,999	Yes
12BW	21-29	Single	Bachelors	35,000-49,000	Yes
13BW	30-39	Married	Bachelors	150,000-199,999	Yes
14BW	50-59	Married	Bachelors	150,000-199,999	Sometimes
16BW	30-39	Single	Bachelors	150,000-	Yes

				199,999	
17BW	50-59	Single	Bachelors	75,000-99,999	Yes
21BW	50-59	Married	Bachelors	50,000-74,999	Yes
33BW	50-59	Single	No Degree	75,000-99,999	Yes
35BW	21-29	Single	Bachelors	50,000-74,999	Yes

Participant #	**Children**	**Pressed Powder**	**Department/Drugstore**	**Shelf Display**	**Minimal Packagin**	**Less packaging Deter**
6AW	Yes	Yes	Department	Somewhat	Yes	No
9AW	Yes	No				
8AW	Yes	No				
13AW	no	yes	Neither	Yes	Yes	No
19AW	No	Yes	Drugstore	Yes	Somewhat	Yes
20AW	No	Yes	Both	Somewhat	No	No
21AW	No	Yes	Department	No	Somewhat	No
22A	No	Yes	Both	Yes	Somewhat	No
24AW	No	No	-	-	-	-
25AW	Yes	No	-	-	-	-
28AW	No	Yes	Drugstore	Somewhat	Somewhat	No
30AW	No	Yes	Both	No	No	No
31AW	No	Yes	Both	Yes	Somewhat	Yes
32AW	No	Yes	Department	Yes	Yes	No
33AW	No	Yes	Department	No	Yes	No
34AW	No	Yes	Neither	Somewhat	Yes	No
38AW	No	Yes	Both	Somewhat	No	Yes
39AW	No	Yes	Both	Yes	Yes	No
40AW	No	Yes	Both	Yes	Somewhat	Yes
41AW	No	Yes	Department	Somewhat	Yes	No
45AW	Yes	Yes	Department	Yes	Yes	No
46AW	Yes	Yes	Department	Yes	Yes	No
51AW	Yes	Yes	Both	Yes	Yes	No
55AW	No	Yes	Department	No	Yes	No
56AW	No	Yes	Department	Yes	Yes	Yes
57AW	Yes	Yes	Both	Somewhat	Yes	No
58AW	No	Yes	Department	No	Yes	No
60AW	No	Yes	Both	Yes	Somewhat	No
66AW	No	Yes	Both	Yes	Somewhat	No
67AW	No	No	-	-	-	-
68AW	No	Yes	Both	Yes	Yes	No

69AW	No	Yes	Drugstore	Yes	No	Yes
75AW	No	No	-	-	-	-
1BW	Yes	Yes	Both	Yes	Somewhat	No
2BW	Yes	No	-	-	-	-
3BW	No	Yes	Both	Yes	Yes	No
4BW	No	Yes	Drugstore	Yes	Somewhat	No
5BW	No	Yes	Drugstore	Yes	No	Yes
6BW	Yes	Yes	Neither	No	Somewhat	No
11BW	Yes	Yes	Both	No	Yes	No
12BW	No	No	-	-	-	-
13BW	Yes	Yes	Neither	Yes	Yes	No
14BW	Yes	Yes	Neither	No	Yes	No
16BW	No	Yes	Neither	No	Yes	No
17BW	No	Yes	Drugstore	Yes	Yes	No
21BW	Yes	Yes	Department	Yes	Yes	No
33BW	Yes	Yes	Department	Yes	Yes	Yes
35BW	No	Yes	Department	Yes	No	No

Participant #	**Brand**	**Tray or Backing**	**Equal**
6AW	Wild	Paper	Neither
9AW			
8AW			
13AW	Neither	Paper	Neither
19AW	Celeste	Clear Tray	Clear Tray
20AW	Celeste	Clear Tray	Clear Tray
21AW	Wild	Neither	Yes
22A	Neither	Neither	Neither
24AW	-	-	-
25AW			
28AW	Celeste	Paper	Yes
30AW	Wild	Paper	Neither
31AW	Neither	Paper	Paper
32AW	Celeste	Clear Tray	Clear Tray
33AW	Wild	Paper	Paper
34AW	Wild	Clear Tray	Neither
38AW	Wild	Paper	Paper
39AW	Celeste	Paper	Yes
40AW	Wild	Paper	Yes
41AW	Wild	Paper	Yes
45AW	Wild	Paper	Paper
46AW	Celeste	Clear Tray	Clear Tray
51AW	Neither	Clear Tray	Yes
55AW	Neither	Neither	Neither

56AW	Wild	Paper	Paper
57AW	Wild	Paper	Neither
58AW	Wild	Paper	Paper
60AW	Celeste	Paper	Paper
66AW	Wild	Paper	Paper
67AW	-	-	-
68AW	Wild	Paper	Paper
69AW	Wild	Paper	Paper
75AW	-	-	-
1BW	Neither	Paper	Paper
2BW	-	-	-
3BW	Celeste	Clear Tray	Clear Tray
4BW	Celeste	Paper	Yes
5BW	Wild	Paper	Neither
6BW	Celeste	Paper	Paper
11BW	Wild	Clear Tray	Neither
12BW	-	-	-
13BW	Celeste	Paper	Yes
14BW	Wild	Clear Tray	Clear Tray
16BW	Wild	Clear Tray	Clear Tray
17BW	Celeste	Clear Tray	Neither
21BW	Wild	Paper	Paper
33BW	Neither	Paper	Yes
35BW	Celeste	Paper	Paper

Participant #	**TTFF Top**	**TTFF Bottom**	**TFD Top**	**TFD Bottom**	**FC Top**	**FC Bottom**
38BW	0.92	2.18	0.23	0.07	3	1
46BW	1.65	0.05	1.55	2.53	15	18
49BW	1.02	-	1.52	-	9	-
50BW	0.88	3.32	1.37	0.77	12	6
52BW	-	-	-	-	-	-
54BW	1.15	0.02	0.92	0.7	6	4
55BW	-	1.68	-	7.35	-	28
56BW	1.75	0.32	5.57	2.95	32	16
57BW	0.08	0.72	1.6	5.83	12	19
58BW	1.62	1.75	0.1	0.67	1	4
59BW	1.88	2.85	0.8	0.7	6	3
65BW	-	0.22	-	0.7	-	7
66BW	3.12	0.55	2.27	0.07	13	1
68BW	-	0.28	-	2.1	-	13
69BW	0.35	1.62	0.07	0.87	1	6
70BW	0.82	0.05	0.4	2.17	4	18
72BW	-	3.65	-	2.15	-	14

74BW	0.02	2.52	0.43	1.42	3	10
77BW	-	-	-	-	-	-
1CW	0.75	-	-	1.58	-	14
4CW	0.08	0.42	3.18	2.43	19	12
8CW	0.42	3.82	5.27	0.13	29	2
10C	1.98	1.32	1.28	0.43	13	2
14CW	2.85	0.48	0.67	0.4	7	4
15CW	0.15	0.22	3.07	1.38	23	9
17CW	-	0.05	0.98	-	6	-
18CW	0.28	0.72	1.23	0.5	9	6
19CW	1.48	2.98	0.53	0.77	4	7
20CW	4.38	0.25	1	0.93	8	6
24CW	2.12	-	-	0.33	-	2
30CW	1.22	0.35	3.53	1.9	23	18
32CW	0.28	2.62	1.6	2.27	11	17
36CW	-	0.95	0.73	-	5	-
37CW	0.55	0.28	0.23	1.23	3	11
38CW	1.38	1.05	0.9	1.75	9	18
39CW	5.38	0.22	1.5	2.4	10	15
42CW	1.72	0.02	0.07	1.97	1	11
43CW	3.68	0.02	0.13	0.1	2	1
45CW	2.82	3.72	0.17	1.37	2	10
47C	-	-	-	-	-	-
48CW	0.98	6.18	0.23	0.77	3	8
50CW	0.25	0.65	0.4	1.07	4	9
54CW	-	1.05	1.1	-	5	-
55CW	3.02	1.52	0.17	0.83	2	9
58CW	1.08	2.98	3.92	2	25	16
59CW	1.95	0.72	1.9	1.4	15	8
66CW	-	-	-	-	-	-
65CW	-	-	-	-	-	-

Participant #	**Age**	**Relationship**	**Education**	**Income**	**Primary Shopper**
38BW	21-29	Single	Bachelors	50,000-74,999	Yes
46BW	21-29	Single	Bachelors	150,000-199,999	Yes
49BW	21-29	Married	Bachelors	150,000-199,999	Yes
50BW	21-29	Single	Bachelors	75,000-99,999	Yes
52BW	21-29	Single	Bachelors	50,000-74,999	Yes
54BW	30-39	Married	Graduate Degree	200,000+	Sometimes
55BW	30-39	Married	Bachelors	75,000-99,999	Sometimes

56BW	40-49	Married	Graduate Degree	150,000-199,999	Yes
57BW	40-49	Single	Bachelors	100,000-149,000	Yes
58BW	21-29	Single	Bachelors	75,000-99,999	Yes
59BW	40-49	Single	Bachelors	75,000-99,999	Yes
65BW	21-29	Single	Bachelors	100,000-149,000	Yes
66BW	21-29	Single	Bachelors	75,000-99,999	Yes
68BW	21-29	Single	Bachelors	50,000-74,999	Sometimes
69BW	21-29	Single	Bachelors	75,000-99,999	Yes
70BW	21-29	Single	Bachelors	75,000-99,999	Yes
72BW	40-49	Married	Graduate Degree	100,000-149,000	Sometimes
74BW	18-20	Single	No Degree	Less than 20,000	Yes
77BW	40-49	Single	Associate	50,000-74,999	Yes
1CW	50-59	Married	No Degree	200,000+	Yes
4CW	30-39	Single	Bachelors	50,000-74,999	Yes
8CW	30-39	Married	Bachelors	200,000+	Yes
10C	50-59	Married	Graduate Degree	200,000+	Sometimes
14CW	21-29	Married	Bachelors	100,000-149,000	Yes
15CW	40-49	Married	Graduate Degree	150,000-199,999	Sometimes
17CW	21-29	Single	Graduate Degree	50,000-74,999	Yes
18CW	40-49	Married	Graduate Degree	200,000+	Sometimes
19CW	18-20	Single	No Degree	Less than 20,000	No
20CW	50-59	Married	Graduate Degree	100,000-149,000	Yes
24CW	21-29	Single	Bachelors	50,000-74,999	Yes
30CW	50-59	Married	Graduate Degree	200,000+	Yes
32CW	18-20	Single	No Degree	100,000-149,000	Sometimes
36CW	18-20	Single	No Degree	75,000-99,999	No
37CW	18-20	Single	No Degree	200,000+	No
38CW	21-29	Single	Graduate Degree	75,000-99,999	Yes
39CW	40-49	Married	Graduate Degree	150,000-199,999	Yes
42CW	40-49	Married	Bachelors	100,000-149,000	Sometimes
43CW	30-39	Married	Bachelors	150,000-	Yes

				199,999	
45CW	40-49	Married	Graduate Degree	200,000+	Yes
47C	21-29	Single	Bachelors	200,000+	Yes
48CW	18-20	Single	No Degree	75,000-99,999	No
50CW	21-29	Single	Bachelors	50,000-74,999	Yes
54CW	21-29	Single	Bachelors	20,000-34,999	Yes
55CW	21-29	Single	High School	200,000+	Sometimes
58CW	30-39	Single	Bachelors	100,000-149,000	Yes
59CW	30-39	Married	Bachelors	200,000+	Yes
66CW	50-59	Single	Bachelors	100,000-149,000	Yes
65CW	40-49	Married	Graduate Degree	200,000+	Sometimes

Participant #	**Children**	**Pressed Powder**	**Department/ Drugstore**	**Shelf Display**	**Minimal Packagin**	**Less packaging Deter**
38BW	No	Yes	Neither	No	Yes	No
46BW	No	Yes	Both	Yes	No	No
49BW	No	Yes	Drugstore	Somewhat	-	Yes
50BW	No	Yes	Neither	Yes	Somewhat	Yes
52BW	No	Yes	Department	No	No	No
54BW	No	Yes	Department	Yes	No	No
55BW	Yes	Yes	Department	No	Yes	No
56BW	No	Yes	Drugstore	Somewhat	Yes	No
57BW	Yes	Yes	Neither	No	No	No
58BW	No	No	-	-	-	-
59BW	Yes	No	-	-	-	-
65BW	No	Yes	Department	Yes	Somewhat	No
66BW	No	Yes	Both	Somewhat	No	No
68BW	No	Yes	Department	No	No	No
69BW	No	Yes	Both	Yes	Yes	No
70BW	No	Yes	Department	No	Yes	No
72BW	Yes	Yes	Neither	Yes	Yes	No
74BW	No	Yes	Neither	Yes	Yes	No
77BW	Yes	No	Department	Yes	Yes	No
1CW	Yes	Yes	Both	Yes	Yes	No
4CW	No	Yes	Neither	Somewhat	No	No
8CW	Yes	Yes	Neither	Yes	Somewhat	No
10C	No	Yes	Drugstore	Yes	No	Yes
14CW	No	Yes	Department	Somewhat	No	Yes
15CW	Yes	Yes	Both	Yes	No	Yes

17CW	No	Yes	Both	Somewhat	Yes	No
18CW	Yes	No	-	-	-	-
19CW	No	Yes	Drugstore	Yes	Somewhat	No
20CW	Yes	Yes	Department	No	Yes	No
24CW	No	Yes	Department	Yes	No	Yes
30CW	Yes	Yes	Department	Somewhat	Yes	No
32CW	No	No	-	-	-	-
36CW	No	Yes	Drugstore	Yes	Yes	No
37CW	No	Yes	Both	Yes	Somewhat	Yes
38CW	No	Yes	Department	No	Yes	No
39CW	No	No	-	-	-	-
42CW	No	Yes	Neither	Somewhat	Yes	No
43CW	No	Yes	Department	Somewhat	Yes	No
45CW	Yes	Yes	Department	No	No	No
47C	No	Yes	Department	Yes	Yes	No
48CW	No	Yes	Neither	Somewhat	Yes	No
50CW	No	Yes	Both	Somewhat	No	No
54CW	No	Yes	Department	Somewhat	Yes	No
55CW	No	Yes	Department	Somewhat	Yes	Yes
58CW	No	Yes	Drugstore	Somewhat	Yes	No
59CW	Yes	Yes	Drugstore	Yes	Somewhat	No
66CW	No	Yes	Department	Yes	No	Yes
65CW	Yes	Yes	Department	No	Yes	No

Participant #	**Brand**	**Tray or Backing**	**Equal**
38BW	Celeste	Paper	Yes
46BW	Wild	Paper	Paper
49BW	Neither	Paper	Paper
50BW	Celeste	Paper	Paper
52BW	Celeste	Paper	Paper
54BW	Celeste	Paper	Yes
55BW	Neither	Clear Tray	Clear Tray
56BW	Celeste	Paper	Paper
57BW	Wild	Paper	Paper
58BW	-	-	-
59BW	-	-	-
65BW	Celeste	Paper	Paper
66BW	Celeste	Paper	Neither
68BW	Wild	Clear Tray	Clear Tray
69BW	Neither	Paper	Paper
70BW	Wild	Paper	Neither
72BW	Wild	Paper	Yes
74BW	Celeste	Clear Tray	Clear Tray

77BW	Neither	Neither	Neither
1CW	Neither	Clear Tray	Clear Tray
4CW	Wild	Paper	Neither
8CW	Celeste	Paper	Paper
10C	Celeste	Paper	Paper
14CW	Wild	Clear Tray	Yes
15CW	Neither	Paper	Paper
17CW	Celeste	Paper	Neither
18CW	-	-	-
19CW	Wild	Clear Tray	Yes
20CW	Celeste	Paper	Yes
24CW	Wild	Clear Tray	Clear Tray
30CW	Neither	Neither	Neither
32CW	-	-	-
36CW	Celeste	Paper	Neither
37CW	Wild	Clear Tray	Clear Tray
38CW	Celeste	Clear Tray	Clear Tray
39CW	-	-	-
42CW	Neither	Clear Tray	Yes
43CW	Celeste	Clear Tray	Yes
45CW	Neither	Clear Tray	Clear Tray
47C	Celeste	Paper	Paper
48CW	Wild	Paper	Yes
50CW	Celeste	Paper	Neither
54CW	Wild	Paper	Yes
55CW	Celeste	Clear Tray	Clear Tray
58CW	Neither	Neither	Neither
59CW	Celeste	Paper	Paper
66CW	Wild	Paper	Neither
65CW	Neither	Paper	Neither

Participant #	**TTFF Top**	**TTFF Bottom**	**TFD Top**	**TFD Bottom**	**FC Top**	**FC Bottom**
6DW	3.35	0.02	3.23	0.1	22	1
7DW	2.35	0.52	0.27	4.5	3	23
14DW	0.28	0.58	1.37	1.23	11	8
16DW	-	-	-	-	-	-
15DW	-	2.32	0.63	-	4	-
18D	6.32	2.58	0.77	0.23	7	2

Participant #	Age	Relationship	Education	Income	Primary Shopper
6DW	21-29	Married	Bachelors	100,000-149,000	Yes
7DW	30-39	Married	Graduate Degree	100,000-149,000	Yes
14DW	30-39	Single	Bachelors	75,000-99,999	Sometimes
16DW	30-39	Single	Graduate Degree	200,000+	Sometimes
15DW	21-29	Single	Bachelors	50,000-74,999	Yes
18D	21-29	Married	Bachelors	75,000-99,999	Yes

Participant #	Children	Pressed Powder	Department/Drugstore	Shelf Display	Minimal Packagin	Less packaging Deter
6DW	Np	Yes	Both	Somewhat	Yes	No
7DW	Yes	Yes	Drugstore	Yes	Yes	No
14DW	No	No	Both	Yes	Somewhat	Yes
16DW	No	No	-	-	-	-
15DW	No	Yes	Both	Somewhat	Yes	No

Participant #	Brand	Tray or Backing	Equal
6DW	Celeste	Paper	Paper
7DW	Wild	Clear Tray	Yes
14DW	-	-	-
16DW	-	-	-
15DW	Wild	Paper	Paper

Table 5. Raw Eye Tracking Data and Survey Results

Appendix B

Statistical Results

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
TTFF	Equal variances assumed	.015	.908	1.649	4	**.174**	.61000
	Equal variances not assumed			1.655	2.095	.234	.61000
TFD	Equal variances assumed	1.321	.315	-.258	4	**.809**	-.50250
	Equal variances not assumed			-.212	1.408	.858	-.50250
FC	Equal variances assumed	.706	.448	-.268	4	**.802**	-1.00000
	Equal variances not assumed			-.226	1.462	.848	-1.00000

Table 6. Pilot Study Independent T-Test Reults

1	TTFF Top for Period 1	TTFF Top for Period 2
2	TTFF Bottom for Period 1	TTFF Bottom for Period 2
3	TFD Top for Period 1	TFD Top for Period 2
4	TFD Bottom for Period 1	TFD Bottom for Period 2
5	FC Top for Period 1	FC Top for Period 2
6	FC Bottom for Period 1	FC Bottom for Period 2

Table 7. Metrics Organized by Period

1	**TTFF Top**	0.853
2	**TTFF Bottom**	0.165
3	**TFD Top**	0.331
4	**TFD Bottom**	0.107
5	**FC Top**	0.334
6	**FC Bottom**	0.035

Table 8. Separated P values for Top and Bottom Metrics

1	TTFF Period 1	0.448
2	TTFF Period 2	0.343
3	TFD Period 1	0.169
4	TFD Period 2	0.283
5	FC Period 1	0.072
6	FC Period 2	0.602

Table 9. Seperated P-values for FC, TTFF, and TFD

Appendix C

Survey

***1. What is your participant number? Be sure to include the numbers and letter. (Example: 55V)**

2. What is your biological sex?

- Male
- Female

3. How old are you?

- 17 or younger
- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60-64
- 65 or older

4. Which of the following best describes your current relationship status?

- Married
- Single

5. What is the highest level of education you have completed?

- Less than high school degree
- High school degree or equivalent (GED)
- Some college but no degree
- Associate degree
- Bachelor degree
- Graduate degree or higher

6. What is your annual household income

- ○ Less than $20,000
- ○ $20,000 to $34,999
- ○ $35,000 to $49,999
- ○ $50,000 to $74,999
- ○ $75,000 to $99,999
- ○ $100,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 or more

7. Are you the primary shopper for your household?

- ○ Yes
- ○ No
- ○ Sometimes

8. Do you have children?

- ○ Yes
- ○ No

9. Did you shop for pressed powder?

- ○ Yes
- ○ No

10. Do you typically buy makeup from a department store or drug store?

- ○ Department Store
- ○ Drug Store
- ○ Both
- ○ Neither

11. Do you feel that the shelf display of makeup impacts your purchase decision?

- ○ Yes
- ○ No
- ○ Somewhat

12. Would minimal packaging (less paper/plastic around the product) appeal to you as a consumer?

- ○ Yes
- ○ No
- ○ Somewhat

13. Would less packaging deter you from purchasing a beauty/cosmetic product?

- ○ Yes
- ○ No

14. Which brand of pressed powder did you choose?

- ○ Wild
- ○ Celeste
- ○ Neither or N/A

15. Was your chosen powder in a clear tray or hanging with a paper backing

- ○ Clear Tray
- ○ Paper Backing
- ○ Neither or N/A

16. Did you feel as though both of the powders were equal in shelf presentation?

- ○ Yes
- ○ No, the paper backing was more appealing
- ○ No, the clear tray was more appealing
- ○ Neither or N/A

Figure 32. Survey Questions

REFERENCES

Ampuero, O., & Vila, N. (2006). Consumer perceptions of product packaging. *Journal of Consumer Marketing*, *23*(2), 100–112. doi:10.1108/07363760610655032

Areni, C. S., Duhan, D. F., & Kiecker, P. (1999). Point-of-Purchase Displays, Product Organization, and Brand Purchase Likelihoods. *Journal of the Academy of Marketing Science*, *27*(4), 428–441. doi:10.1177/0092070399274003

Chandon, P., Hutchinson, J. W., Bradlow, E. T., & Young, S. H. (2009). Does In-Store Marketing Work ? Effects of the Number and Position of Shelf Facings on Brand Attention, *73*(November), 1–17.

Clement, J., Kristensen, T., & Grønhaug, K. (2013). Understanding consumers' in-store visual perception: The influence of package design features on visual attention. *Journal of Retailing and Consumer Services*, *20*(2), 234–239. doi:10.1016/j.jretconser.2013.01.003

Crilly, N., Moultrie, J., & Clarkson, P. J. (2004). Seeing things: consumer response to the visual domain in product design. *Design Studies*, *25*(6), 547–577. doi:10.1016/j.destud.2004.03.001

Duchowski, A. (2007). *Eye Tracking Methodology: Theory and Practice* (2nd ed.). New York, New York, USA: Springer.

Folkes, V., & Matta, S. (2004). The effect of package shape on consumers' judgments of product volume: Attention as a mental contaminant. *Journal of Consumer Research*, *31*(2), 390–401. Retrieved from http://www.jstor.org/stable/10.1086/422117

Holdway, R., Walker, D., & Hilton, M. (2002). Eco-Design and Successful Packaging. *Design Management Journal (…*, 45–53. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1948-7169.2002.tb00330.x/abstract

Hurley, R, & Galvarino, J. (2012). The Effect of Modifying Structure to Display Product vs. Graphical Representation on Packaging. *… World Packaging …*, (September 2012), 453–460. doi:10.1002/pts

Hurley, R. a., Ouzts, A., Fischer, J., & Gomes, T. (2013). Usability of Package and Label Designs Using Eye Tracking .pdf. *Packaging Technology and Science*, *26*(7), 399–412. doi:10.1002/pts.2012

Hurley, RA, & Ouzts, A. (2013). Effects of Private and Public Label Packaging on Consumer Purchase Patterns. *Packaging Technology …*, *25*(3), 290–301. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/pts.2012/full

Kollat, D., & Willett, R. (1967). Customer Impulse Purchasing Behavior. *Journal of Marketing Research (JMR)*, *IV*(February), 21–31. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=00222437&AN=5000400&h=WWZrA%2F0LvzhZIrlRax335z0MXtc1c70CL%2B7SOMKG8hDEzjuWDWBN659CwGBzpYrVe7mrYF2x7UBpnAm0qAWqkg%3D%3D&crl=c

Koukos, P. (2002). Is your shelf-evident ?, 25–31.

Lee, S. G., & Lye, S. W. (2003). Design for manual packaging. *International Journal of Physical Distribution & Logistics Management*, *33*(2), 163–189. doi:10.1108/09600030310469162

Lewis, H., Fitzpatrick, L., Verghese, K., Sonneveld, K., Jordon, R., & Alliance, S. P. (2007). Sustainable Packaging Redefined, (November).

Ljungberg, L. Y. (2007). Materials selection and design for development of sustainable products. *Materials & Design*, *28*(2), 466–479. doi:10.1016/j.matdes.2005.09.006

Nordin, N., & Selke, S. (2010). Social aspect of sustainable packaging. *Packaging Technology and Science*, (May), 317–326. doi:10.1002/pts

Pannasch, S., & Dornhoefer, S. (2001). The omnipresent prolongation of visual fixations: saccades are inhibited by changes in situation and in subject's activity. *Vision research*, *41*(25-26), 3345–3351. doi:10.1016/S0042-6989(01)00207-3

Point of Purchase Promotions. (n.d.). *Boundless*. Retrieved March 12, 2014, from https://www.boundless.com/marketing/personal-selling-sales-promotion/consumer-sales-promotion-methods/point-of-purchase-promotions/

Raghubir, P., & Greenleaf, E. (2006). Ratios in proportion: what should the shape of the package be? *Journal of Marketing*, *70*(April), 95–107. Retrieved from http://journals.ama.org/doi/abs/10.1509/jmkg.70.2.95

Rundh, B. (2009). Packaging design: creating competitive advantage with product packaging. *British Food Journal*, *111*(9), 988–1002. doi:10.1108/00070700910992880

Shopper Marketing Glossary. (2013a). *Southern Imperial*. Retrieved March 13, 2014, from http://www.popdesign.com/glossary?letter=b

Shopper Marketing Glossary. (2013b). *Southern Imperial*, F. Retrieved from http://www.popdesign.com/glossary?letter=f

Shopper Marketing Glossary. (2013c). *Southern Imperial*. Retrieved March 13, 2014, from http://www.popdesign.com/glossary?letter=s

Shopper Marketing Glossary. (2013d). *Southern Imperial*.

Shopper Marketing Glossary. (2013e). *Southern Imperial*. Retrieved March 13, 2014, from http://www.popdesign.com/glossary?letter=e

Snyder, E. (2013). *Effectiveness of Display Trays on Attention and Purchase of Consumer Products*. Clemson University.

Svanes, B. E., Vold, M., Møller, H., Pettersen, M. K., Larsen, H., & Hanssen, O. J. (2010). Sustainable Packaging Design : a Holistic Methodology for Packaging Design, (February), 161–175. doi:10.1002/pts

Thackston, K., Pham, A., Galvarino, J., & Ouzts, A. (n.d.). Consumer Purchasing Based on Packaging Structural Design/Product Visual Display in a Retail Environment. *andrewd.ces.clemson.edu*. Retrieved from http://andrewd.ces.clemson.edu/courses/cpsc412/fall11/teams/reports/group7.pdf

Underwood, R. (2001). Packaging communication: attentional effects of product imagery. *Journal of Product & ...*, *10*(7), 403–422. doi:10.1108/10610420110410531

Van Weenen, J. C. (1995). Towards sustainable product development. *Journal of Cleaner Production*, *3*(1-2), 95–100. doi:10.1016/0959-6526(95)00062-J

Wansink, B. (1996). Can package size accelerate usage volume? *The Journal of Marketing*. Retrieved from http://www.jstor.org/stable/1251838

Wells, L. E., Farley, H., & Armstrong, G. a. (2007). The importance of packaging design for own-label food brands. *International Journal of Retail & Distribution Management*, *35*(9), 677–690. doi:10.1108/09590550710773237

You, H., & Chen, K. (2007). Applications of affordance and semantics in product design. *Design Studies*, *28*(1), 23–38. doi:10.1016/j.destud.2006.07.002

Young, L. R. (1975). Survey of eye movement recording methods, *7*(5), 397–429.

Zwicker, D., & Antônio, F. (n.d.). Sustainable Packaging Design Model, *55*(47), 1–8.